CONGRESSIONAL APPLICATIONS OF INFORMATION TECHNOLOGY

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EXECUTIVE SUMMARY

TASK 1: SUMMARY AND IMPLICATIONS OF MAJOR INFORMATION TECHNOLOGY APPLICATIONS ADOPTED BY CONGRESS

The last decade has seen Congress move from the backwaters of information and communications technology into the ranks of sophisticated users. In the rush to take advantage of such technologies as television and especially computers, most of the effort has been placed on getting the new systems up and running. Little attention has been paid to the social, organizational and political implications of altering information processing--the core technology of Congress.

Experience from other realms and observations of Congress indicate that the introduction of technology could affect Congress in seven general ways:

(1) Increasing the Efficiency of the Organization and its Members
(2) Creating an "unlocking" effect by making tasks once thought of as impossible, within the realm of feasibility
(3) Changing the organizational structure, especially as it relates to centralization of personnel and power
(4) Revising the quality of work life and satisfaction
(5) Altering the process of representation and affecting political security
(6) Shifting power between institutional members and among institutions
(7) Changing the nature of the policy making process and the nature of policy outcomes

Table 1 lists some of the information technologies adopted by Congress and outlines the general areas in which they have impacted on the institution and its Members.

TABLE 1 The Implications of Specific Information Technology Applications on the Congress

APPLICATIONS	IMPLICATIONS						
	EFFICIENCY	UNLOCKING	ORGANIZATIONAL STRUCTURE	WORKING CONDITIONS	REPRESENTATION (POL. SECURITY)	POLICY PROCESS	POWER
Bill Status System	X					X	
Legislative Analysis							
-Bibliographic Searches	X					X	X
-Predictive Models		X				X	X
Electronic Voting	X				X	X	X
Correspondence Management	X	X		X	X	X	
Electronic Mail	X	X	X				
Televised House Proceedings	X				X	X	X
Oversight							
-Budget Tracking		X				X	X
-Geographic Reports					X	X	X
-Inter-branch Data Transfer		X				X	X
Grants Programs		X			X		
Personal Computers	X	X	X			X	X

X denotes significant impact in this area

While generally promoted on the basis of increasing efficiency, it is clear that the adoption of modern information technology by the Congress goes well beyond such implications and affects the very core of the legislative process. For individual Members, technology has made it easier to communicate with constituents, increased political security, increased the amount of information and shifted some of the bases of personal power. For Congress as an institution, technology has bolstered decentralization, shifted public focus to the House, and put Congress in an enhanced power position relative to the executive branch. For the policy process, expanded information capabilities have increased the bases for conflict and focused decisions on different types of data.

TASK 2: IDENTIFICATION, DESCRIPTION AND EVALUATION OF CONGRESSIONAL INFORMATION TECHNOLOGY PILOT PROJECTS

In attempting to determine the actual consequences of introducing information technology, Congress has relied on a variety of pilot projects. Most have not been of the formal experimental type, but more informal testing using receptive offices and individuals. Through borrowed equipment or use of what was at hand, the pilots have proven to be a cost-effective way of determining the broadest consequences of this new technology.

TASK 3: AN IN-DEPTH LOOK AT SELECTED CONGRESSIONAL APPLICATIONS OF INFORMATION TECHNOLOGY

A closer look at three diverse applications of information technology helps in understanding both the complexity of imposing technology on an organization and the difficulty of anticipating consequences.

ELECTRONIC MAIL

For an organization such as Congress comprised of many busy individuals in need of quick and complete communication, computer-based electronic mail promised a dramatic increase in efficiency. While still in the early stages of adoption, it is clear that there are major impediments to broad usage and heavy usage will be limited for the forseeable future. Electronic mail (EM) works best in relatively small organizational units (such as committees and Member offices) where an authority figure can overcome initial hesitancy by demanding its use. Particular congressional sub-units (committees,support agencies, Member offices,etc.) have found EM very useful. Attempts to link Congress with constituents or the executive branch have largely been failures. In order to be successful , EM requires conducive attitudes, active promotion and adequate equipment available to

everyone in the communications network.

The final story on electronic mail can not be written yet. While usage is growing, it remains more of a potential than a reality.

INTER-BRANCH INFORMATION SHARING AND CONGRESSIONAL OVERSIGHT

Computerization of information facilitates information transfer between the branches of government. Congress would clearly be better able to perform its oversight function with better access to relevant executive branch information. Although most people agrees with information sharing in the abstract, some definite impediments remain. From a technological perspective getting two computer systems to "talk" to each other presents a major problem. From a data perspective, executive branch data bases were created to serve their own needs. The nature, quality and format of the data available from the agencies may not match the needs of Congress. While formidable, the technological and data problems pale compared with the political ones. "Information is Power," and it is seldom willingly shared unless the source sees some advantage. Congress collectively points its finger at the executive branch and expects open sharing, but it simultaneously must take an inward look at its own policies of open access to information before pointing an accusing finger.

While some major impediments remain, some selective sharing of computerized data bases leads to encouragement. Sharing seems to work best when the information is simply new in format, not content; when Congress has something to trade; when based on aggressive demands by Congress; and within policy systems marked by extensive empirical data and interchange of staff.

The sharing of computerized information and enhancing Congressional oversight will be a slow, but productive process.

TELEVISING CONGRESSIONAL PROCEEDINGS

Contrary to much technological change, the decision to televise the proceedings of the House was preceded by extensive analysis and debate as to the probable consequences. The general conclusions that the House and its Members would gain visibility and that some increased inefficiency (more speeches and policy conflict) would be evident have been borne out. Given the small and unique characteristics of the audience for congressional proceedings, broad changes in public attitudes and behavior are not discernable. The longer term questions as to how enhancing the visibility of the House will affect the separation of powers and the policy process are still at the speculative stage.

TASK 4: OUTLINING PAST, PRESENT AND FUTURE TRENDS IN THE APPLICATION OF INFORMATION TECHNOLOGY BY CONGRESS

Congress and its Members have generally shifted from indifference or skepticism about the utility of information technology to acceptance and the demand for new services. The period of fascination with "the machine" will undoubtedly give way to some disillusionment as unrealistic expectations can not be met. Eventually Congress will hopefully be able to see each application in the more realistic light of both its potential and limitations.

PAST AND PRESENT TRENDS

While starting from two different perspectives, the central control of computerization by the Senate and individual discretion by House members have begun to merge as both computer systems settle-in as mixed systems. The once unique sub-set of Members using computer support has diminished as the frequency and breadth of usage continually increases. The initial emphasis of using information technology for routine legislative monitoring and especially to enhance constituent communications efficiency and capabilities , is beginning to be joined by more sophisticated uses of information technology to support the policy-making process. Although never at the forefront of technological change, the U.S. Congress, while once lagging far behind other legislative bodies, has become a leader in applying technology to legislative tasks.

SOME FUTURE TRENDS

There is no doubt that the demand for information technology will increase. Two key words for the future will be the development of "networks" linking the components of congressional offices with each other and outside data bases, and the "integration" of information and communications technologies. The availability of increased computer based information will force the policy process to take such data into account as a method of anticipating problems rather than reacting to them. Expanded usage of communications technologies such as teleconferencing, televising the Senate and information transmission and transfer will increase efficiency and expand available information. The introduction of the personal computer will democratize policy analysis and lead to creativity and policy conflict, while reducing the ability to control computer applications.

If the changes of the last decade in Congress are compared with those in the offing, the future will be exciting for analysts of the Congress, if bewildering for the participants. The equipment is largely in place, what is next is a dramatic expansion of actual usage which will expand the impact on efficiency,job

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

TASK 1: SUMMARY AND IMPLICATIONS OF MAJOR INFORMATION TECHNOLOGY APPLICATIONS ADOPTED BY CONGRESS 7

Potential Implications of Information Technology 8

-Information Technology and Efficiency 8

-Information Technology and the "Unlocking Effect" 9

-Information Technology and Organizational Structure 9

-Information Technology and Quality Work Life 9

-The Impact of Information Technology on Representation and Political Security 9

-The Power Payoffs of Information Technology 10

-The Impact of Information Technology on the Policy-making Process and Policy Outcomes 11

Assessing the Actual Impact 12

Major Congressional Information Technology Applications and Their Implications 13

-Monitoring and Tracking Legislation 14

-Legislative Analysis Applications 15

-Record Keeping Applications 18

-Congressional Communications 21

-Oversight and Grantsmanship 29

Some Overall Implications 30

TASK 2: IDENTIFICATION, DESCRIPTION AND EVALUATION CONGRESSIONAL INFORMATION TECHNOLOGY PILOT PROJECTS 34

The Pilot Project Rationale 35

The Use of Information Technology Pilot Projects by Congress 36

Some Examples of Information Technology Pilot Projects 36

-CRS Issue Briefs 36

-Pilot MIN 37

-Pilot MOSS 37

-CMS 37

-Televised House Proceedings 38

-House Electronic Mail 39

-Videoconferencing 39

-Senate Office Automation 40

-Other Current Pilots 41

TASK 3: AN IN-DEPTH LOOK AT SELECTED CONGRESSIONAL APPLICATIONS OF INFORMATION TECHNOLOGY 41
Electronic Mail for the Congress 42
-What is EM? 42
-The Purported Advantages 42
-Some Purported Disadvantages 43
-Some Actual Applications of EM in the Congress 45
-Some Successful Applications 45
-Some EM Failures 48
-Some General Lessons from EM Applications 49
Inter-Branch Information Sharing and Congressional Oversight 51
-The Promise of Computers 51
-Some Preliminary Cautions 52
-Some Factors Which Facilitate Inter-branch Information Sharing 56
-Some Lessons On Information Sharing Across Branches 57

Televising Congressional Proceedings 58
-Some Initial Hopes and Fears 58
-The House Television System 60
-The Impact of House Television Coverage on the Public 62
-The Consequences for the Chamber and Its Members 63
-Some Remaining Questions 66

TASK 4: OUTLINING PAST, PRESENT AND FUTURE TRENDS IN THE APPLICATION OF INFORMATION TECHNOLOGY BY CONGRESS 67
Past and Current Trends 67
-Changing Attitudes 67
-The Provision of Equipment 68
-Applications 69
-Usage Patterns 70
Some Trends for the Future 74
-Increased Demand 74
-Networks and Integretion 75
-New Opportunities for Decision-Making Information 76
-Teleconferencing 77
-Televising Congressional Proceedings 77
-Information Transfer 78
-Personal Computers 78

TASK 5: SOME QUESTIONS FOR FUTURE RESEARCH 79
The Data Required for Future Research 79
Public Policy Questions 80
-Civil Liberties: The Question of Privacy 80
-Civil Rights: The Right to Access 81

-Democracy and Representation 82

REFERENCES 83

TABLES

TABLE 1 The Implications of Specific Information Technology Applications on the Congress 2
TABLE 1.1 Over Time Changes in the Number of Roll Call Votes 20
TABLE 1.2 The Volume of Congressional Franked Mail 23
TABLE 1.3 The Distribution of Congressional Staffs Between Washington and District Offices 27
TABLE 1.4 Milestones in Congressional Use of Information and Communications Technology 31
TABLE 1.5 The Implications of Specific Information Technology Applications on the Congress 32
TABLE 3.1 Anticipated Consequences of Televising House Proceedings 59
TABLE 4.1 The Growth of Computer Usage by House Members 71
TABLE 4.2 The Declining Uniqueness of House Computer Users 71

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TASK 1: Summary and Implications of Major Information Technology Applications Adopted by Congress

A decade ago, Congress stood in the back waters of information technology applications with little more than routine payroll uses of the computer. Congress' timidity to enter the "Information Age" has been replaced by an aggressive desire to provide both the institution and its individual members with the sophisticated information tools available in other realms. Today their is hardly a congressional office without at least one computer terminal. Some are on their second or third generation of machines. The televising of the House through cable television has opened up a window on the congressional process which provides the average citizen with more insight on congressional decision-making than ever before. While some applications of technology have "simply" increased the efficiency in handling routine tasks (writing constituent letters, monitoring the status of bills ,etc.), others have opened up new horizons and made once unthought of tasks routine (targeting mailings, full text searching of congressional documents, models which predict the consequences of policy, etc.). Both inside and outside observers agree that modern information technology is a crucial part of contemporary congressional procedures and are likely to grow in importance.

> We are in the new era of machine politics where the machine is the computer (Alan Baron quoted in Green, 1979, p. 276).
>
> Literally, the House is almost completely automated already and the increased productivity shows.
>
> Despite what you hear around here, the Senate is not behind in terms of technology. While we have not applied some of the flashy graphics and the like, we are on the forefront of applying technology.

---

*The findings in this paper are based on the sources cited and over forty in-depth interviews. Quoted material without attribution comes from the author's interviews.

While it is readily evident that information technology has arrived on Capitol Hill, more attention has been paid to acquiring it and getting it up and running than to anticipating or analyzing its consequences. There has been a bit more attention paid to the consequence of technology for Congress than John Worthley's 1977 challenge that: "hardly a study is available which analyzes the consequences of modern legislative information systems for the legislative process, for democratic government, or for public policy making" (Worthley,1977 b, p. 425). However most of the analysis has been in the academic realm, rather than for or by practitioners. There is a common tendency to assume that technology is neutral. It is wise to heed Senator Hubert Humphrey's early warning to "never underestimate the power of a computer...History's most profound revelations have been underestimated by their contemporaries" (Hubert Humphrey, in U.S. Congress, Senate, CONGRESSIONAL RECORD 1964: 9075). The emergence of Congress as a heavy user of information technology (both computers and communications technologies) is more than the story of an institution and its members belatedly, but now almost wholeheartedly following other segments of society into the information technology age. Installing new technologies involves more than a simple revision of procedures and capabilities. The availability of the fruits of technology carries with it the potential for changing the structure, behavior patterns, job desirability, and outputs of the institution and its members.

Potential Implications of Information Technology

Before outlining the major information technologies currently being used by Congress, and commenting on the implications, it is important to identify the types of implications it is reasonable to expect.While few specific applications will have an effect in each of these areas, some of the applications will affect each.

INFORMATION TECHNOLOGY AND EFFICIENCY

In order for an operation to be efficient, it should produce a high quality product a maximum speed using the minimum amount of resources. Through the routinization of tasks, reduction of duplication and using machine rather than human resources, information technology provides efficiently directly. By relieving the human components of an organization of time-consuming tasks, technology can promote efficiency indirectly by allowing them to focus their efforts on more creative and important activities. Few innovations deliver all they promise, especially as it relates to efficiency. While many of the information technology applications have increased the quality of the product, increased the speed of delivery and freed individuals, cost savings have generally been more elusive. With the adoption of information technology legislative branch appropriations and staff grew at an accelerated rate.

INFORMATION TECHNOLOGY AND THE "UNLOCKING EFFECT"

Tasks once though of as impossible due to limited time and resources can now often be done due to the introduction of modern information technology. Analysis once too complicated to generate by hand seem to emerge in an effortless manner. With less effort than it once took to adressograph a mailing to an outdated and inappropriate list, the computer can generate a targeted mailing list of the most appropriate recipients, and personalyze the letters to boot. While computer technology generally does not do tasks which conceivably could not be done by hand, the amount of human effort required for certain tasks assured that they would not even be attempted. Communications technologies , on the other hand, open up new horizons for spreading a message which were inconceivable until the of these technologies.

INFORMATION TECHNOLOGY AND ORGANIZATIONAL STRUCTURE

While information has always been an organizational resource, the adoption of information technology highlights decisions over who controls and who has access. In some organizations, the existing organizational structure is used to define the role and control of the technology. Increasingly the very nature of new technology changes the organizational structure either independently or according to a well thought out plan. Initial studies of information technology asserted that it is "a cause of, and contributes to, centralization of authority and decision-making" (Chartrand and Morentz, 1979, p. 114). As we have moved from the age of mainframe and centralized data processing to personal computers, such a generalization increasingly stands in question.

INFORMATION TECHNOLOGY AND QUALITY OF WORK LIFE

While virtually all proponents of information technology at least feign a deep concern for the "human engineering" aspects of technology, it is insightful to note that it is the humans who are often the ones to be "engineered" and made to adapt to the machines. While reducing tedious tasks, freeing one for other presumably more challenging duties, and enhancing the quality of one's work often follow the adoption of technology;that same technology can also engender physical and psychological discomfort,change the recruitment, training and advancement patterns as well as affect duties, job location and satisfaction. While most of these implications potentially affect congressional staff more than Members, the Member is indirectly affected by what happens to his staff.

THE IMPACT OF INFORMATION TECHNOLOGY ON REPRESENTATION AND POLITICAL SECURITY

The republican form of government was designed by the Founding Fathers to permit interested citizens representation of their desires through frequent elections and easy access to information on how their representatives were looking out for their interests. The ultimate weapon for citizens dissatisfied with the representation they receive lies in removing their representative at the next election. Information technology holds the promise of helping "bridge the gulf between the citizen and his government" (Brademas,1971, p. 320) by improving accessibility, public awareness, and communications from constituents. For example, improved coverage of Congress by C-SPAN will stimulate citizen interest, while technology assisted polling capabilities and sophisticated mail count analyses would give elected officials a better idea of who supports which policy options. At the same time efficient use of technology could become one more weapon in the arsenal of the modern politician. While there is clearly a great deal to be gained from elected officials who garner support through technology facilitated improvements in representation, technology can also give the semblance of effective representation when little exists.

THE POWER PAYOFFS OF INFORMATION TECHNOLOGY

> In the realm of politics as elsewhere, the old forms of power, such as money or material rewards, have become relatively insignificant. The new "power currency" is information (McHale, in Thomas, 1978, p. 818).

> The effects and advances in information technology on society have been viewed as more disruptive than any other technological impact...It is possible, that such impacts will change the very locus and function of power...(McHale, 1976, p. 1)

The power of an individual or organization becomes evident when they can get another individual or organization to behave in a way they had not intended. The concept of power encompasses a number of different processes, each of which is to some degree dependent on information. In a "persuasion" process, the persuader will be most effective if they know the preconceptions of the influence target and have adequate information to convince the target that what they are proposing is actually in the target's best interest. When "authority" serves as the basis for power, the influencer who can prove that he has the legitimate right to compliance will carry the day. In " leadership" situations, in which the target gives up his or her own power to decide on a course of action and willingly follows the suggestion of the leader, often develop when the target perceives the leader to be more experienced and in command of better and/or more information. When a political actor must resort to forcing compliance through "rewards and sanctions", it helps tremendously to have information concerning the rewards and sanctions available and those with most utility for dealing with particular targets. To the degree that information helpful for exercising power is available through the use of information technology,

those who control and/or have access to such information will gain power over those who do not.

The potential power payoffs for the Congress include shifts of power between individual Members (Members with access to information technology gaining power over those who do not),shifts between intra-legislative groups (junior Members gaining over senior Members, committees gaining over party leaders, etc.), or inter-institutional shifts (The House gaining over the Senate, Congress gaining relative to the executive branch, etc.)

Information technology challenges Congress uniquely since information process is the "core technology" of legislative bodies. Traditionally access to more and better information in Congress has gone to those members with long tenure who gained information through experience and the selective access given to those in party of committee leadership positions. Senior members often carried the day through the "resident information" they carried around in the back of their heads. As the information explosion made it increasingly impossible for anyone to keep abreast of even the narrowest specialty, and as the introduction of information technology provided alternative routes to sorting through the information overload, the day of the "resident information expert" gave way to those individuals with "access information" and rights. Access to modern information technology often requires a new set of skills and the necessary interest. To the degree that traditional power holders lack interest or foresight to limit the access of junior Members, open access to the skills necessary to tap the new technology is likely to create a cadre of legislators who can challenge the "resident information" power holders. The potential for intra and inter-institutional shifts are as significant. Information technology holds the promise of redefining information advantages and giving some institutions and individuals increased ability to communicate their interests in a timely and efficient manner.

THE IMPACT OF INFORMATION TECHNOLOGY ON THE POLICY-MAKING PROCESS AND POLICY OUTCOMES

The institutional responsibility of Congress (as opposed to the representational responsibility of individual members) is to produce good public policies in a timely and effective manner. While information, computerized or otherwise, can not verify the values which underly a legislator's criteria for determining the "goodness" or particular policies, once the normative criteria have been established, the availability of more complete, correct and relevant information on the situation provides the raw materials for policy decisions. Information technology holds the promise of delivering the necessary information in time to have an impact on the decision, whereas in the past no one was aware that the information existed, or it arrived after the decision

had to be made. Sophisticated analyses once thought to be beyond human will and skills may now flow regularly into the legislative cauldron. On the darker side, modern information technology thrives on certain kinds of information--that which can be counted and coded into a limited number of categories--and with the ability to present such information in increasingly sophisticated forms, it may drive "softer" forms of data out of consideration.

If the impact of information technology on the substance of policy-making is tangential, its likely impact on the process is more direct. The ability to monitor legislative action through information technology provides a new strategic environment. Policy analysis tools can broaden the number of options considered, while increased information on the consequences of policy could change the level of conflict associated with traditional congressional policy making . Communications technologies which allow previous outsiders to directly view the process hold a great deal of potential for changing the chemistry of the decision-making process.

Assessing the Actual Impact

In the abstract there is a temptation to dismiss the introduction of information technology to Congress as either minor tinkering with a hidebound institution or the primal cause of every change, contemporary or forthcoming. Reality obviously lies somewhere in between. It is the basic premise of this analysis that existing research has tended to underestimate the degree and nature of the change information technology has spawned.

There are a number of ways to assess change and assign cause. One approach is to generalyze from other realms. While information technology is relatively new to the Congress,many other institutions in society have been carefully studied as they traversed the path from traditional to modern information processing. There is a temptation to argue that Congress is such a unique institution that experiences in other realms would not be valid predictors. It seems though, that the uniqueness of Congress has been over stated. If we are careful to use research from other realms as suggestive, rather than determinative, such a wide casting of our nets is appropriate. We must continually remember that:

> Technologies do not "impact" on organizations like two ships colliding at sea. Instead, technological innovations are filtered through an organizations's traditions, constraints and resources. (Laudon, 1974, p. 30)

A second approach lies in verifying suggestive implications from other realms and looking for unique impacts through the comments

of Members of Congress and their staffs. Rather than carrying out a general survey of Hill inhabitants, this research proceeded through informant interviews with individuals in close contact with the new technology. While this approach avoids sifting through many extraneous comments by marginally aware or interested individuals, it holds the danger of dealing with individuals who "can't see the forest for the trees." An attempt has been made to avoid narrow perspectives through a broad range of interviews (over 40) with individuals having widely varying experiences.

Where possible, the analysis of empirical data served as the third approach to measuring the impact of technology. The limited availability of empirical data to measure some of the most important implications made such verification only selectively applicable.

In selecting the implications on which to focus, preference was given to those which exemplified changes in KIND, rather than simply change in DEGREE. For example the simple fact that information technology changes the speed and spread of communications (a change in DEGREE) is of less importance than if it changes what is being communicated, the style of communications or the reaction of the recipient (changes in KIND).

Major Congressional Information Technology Applications And Their Implications

Modern information technology has spread through Congress with a vengeance, with few areas completely immune from the trend. Section Four of this report will outline in more detail the trends in adopting technology. At his point it is enough to mention that the adoption process has not followed a smooth pattern guided by an overall plan. The decision to adopt specific technologies has been divided into those choices reserved for individual offices, and those requiring chamber wide support. The House followed a pattern of facilitating technology through providing the financial resources and technical support, but leaving most of the decision to individual Members and offices. The Senate on the other hand opted for centralized provision of services. The disjointed nature of technology adoption explains why most of the adoption process focused on getting systems "up and running" with little concern for the human, institutional, and policy implications on which this section will focus.

With the wide variety of applications, a number of decision had to be made as to which applications this section would focus. Less emphasis has been given to the more routine administrative applications which improve efficiency, but are largely transparent to the users. Emphasis has been placed on those applications which affect the everyday functioning of Congress

and which impinge on Congress' prime role as a representative policy-making institution. While the following categories of applications are meant to be both exhaustive and mutually exclusive, a number of applications fall into more than one category, but will be discussed only once.

MONITORING AND TRACKING LEGISLATION

Congress deals with thousands of pieces of legislation each year. Public records need to be kept as to the public disposition of each bill or resolution, while individual Members need to monitor that legislation of particular interest to them. Prior to computerization, Congress relied on such paper products as the House and Senate Calendars and the DIGEST OF PUBLIC GENERAL BILLS AND RESOLUTIONS. These resources were often cumbersome to use and not as timely as would be desired.

The creation of the three (House,Senate and Library of Congress) coordinated, but separate LEGIS (Legislative Information) Systems allows tracking of bills and amendments by subject,sponsor and bill number. A variety of options allows one to recover a summary of the legislation, listings of co-sponsors and the current disposition, while more sophisticated searching allows the creation of tailor-made subsets such as all legislation introduced by a particular committee or on a specified subject. Users can establish a "tickler system" which alerts them if action has been taken on legislation in which they have a particular interest. in.

The Implications of the Bill Status System

The major implication of an automated bill - status system lies in the EFFICIENCY it provides for legislative staff who no longer have to wade through voluminous printed documents or try to get through the busy phones of the Bill Status Office. Now staff members have direct access to the up to date information on their own time schedule. For the Member, the monitoring of legislative activity allows better planning to anticipate upcoming votes. Computer skills have affected the kinds of skills desired in a staff member. The story of the staff member who moved from a congressman's mail room to being a chief leadership strategist on the floor because he knew how to access the data bases is but a variant of dozens of similar stories.

In policy terms, the Bill Status System makes it possible for more Members to be part of the decision process. As one staff member stated, "Any Member with a half decent staff has no excuse for getting caught with his pants down. He should know what is on tap." Once upcoming decisions have been identifed through changes in the Bill Status System, Members can seek out the background information to bring themselves up to speed. Fewer

decisions can be "slipped by" with no one seeing them. With more participants aware, POLICY QUALITY and POLICY CONFLICT should increase. As a Senate staff member explained,

> LEGIS helps the Senator keep track of legislation in committees of which he is not a Member. In the past you needed a friend on the committee to keep you informed. Now there is less chance of something going by unnoticed...It stretches the senators out. They can't just throw up their hands and say, "Oh! I just did not know about that." Now they have a broader responsibility.

LEGISLATIVE ANALYSIS APPLICATIONS

Information technology has opened a number of doors for increasing the EFFICIENCY and comprehensiveness of legislative research. Computers facilitate problem definition, canvassing alternatives and projecting consequences. The bibliographic data bases available through the Library of Congress SCORPIO system and a number of commercial data bases (NEW YORK TIMES, UPI, etc.) allow analysts to receive bibliographic citations and in some cases full text retrieval of timely information on legislative questions. Individuals can specify legislative topics in which they are interested and receive weekly updates of new material in their area of interest through Selective Dissemination of Information (SDI) from the Library of CongRess. CongRessional Research Service reports can be ordered and in some cases transmitted via computer. The Justice Retrieval and Inquiry System (JURIS) allows keyword or subject searches of the U.S. Constitution, U.S. Code, Supreme Court Decisions and a variety of Justice Department briefs. The CONGRESSIONAL RECORD (CR) file allows subject matter and individual searching of the RECORD.

As a result of such search capability, the diligent legislator can be informed on a wider variety of topics. The POWER of such individuals is enhanced as they are able to make an impact and impression through timely information. One staff member described it by saying:

> The data bases have improved hearing preparation. I was asked to help a congressman opposed to a piece of legislation. Facing a hearing stacked in favor of the bill by the chairman, he knew that little opposing information would come from the hearings. We looked up the witnesses in the NEW YORK TIMES and other indexes. During the hearing, one witness tried to prove his qualifications by referring to an article he had written. My congressman tried to keep him honest by saying "Oh, you mean this one," as he showed it to him. It was one of the articles our search had turned up. The committee chairman was taken by surprise and looked at his staff aide saying, "Why haven't I seen that

article?"

Better informed Members can also mean improved quality of PUBLIC POLICY. On the other hand increased information does not necessarily mean a more reasonable decision-making process. Information becomes the ammunition in the persuasion process. The more members who have information, the more drawn out and subject to POLICY CONFLICT the process may become. Relatively inexperienced members not on the originating committees may well feel capable of participating in policy debates, where they might have bypassed those particular debates in the past when information was harder to come by. While an informed legislator is better than an uninformed one, information overload can be as dangerous as information underload. Information technology must be used to protect us from too much information as well as assure that we have what we need.

A further step in the direction of more sophisticated legislative analysis are the computer based models which predict the consequences of various policy options. There are two basic types of models used by the Congress. (1) Data-based or "feed-forward" models predict the future by relying on an historical data base an allow the analyst to made minor alterations an assess the consequences. (2) Logic-based models are more sophisticated and predict the future through deductive reasoning. Actual data may serve as the basis for some equations, but the heart of the model is a set of assumptions linked together through mathematical or logical equations.

Feed Forward Models

The feed-forward models attempt to predict the "first-order" impact of policy choices. These models assume that people will behave the same as in the past and only attempt to predict the consequences of different distributions of resources or distribution formulas. For example, the Individual Tax Estimation System developed by the Department of the Treasury allows one to estimate changes in revenue by varying tax liability laws for categoric groups of taxpayers. The Social Programs Model projects federal funding distributions under different proposals. The Transfer Income Model estimates changes in federal programs and their impact on income groups and geographic areas, while the Countercycle Revenue Sharing Model can be used to test the effects of alternative revenue sharing formulas (See Frantzich, 1982, pp. 157-159 for more details). The unerlying effect of these models is that congressmen have a more precise indication of the consequences of alternative policies, both in general and in some cases for their particular constituencies. This could increase POLICY CONFLICT since "winners" and "losers" in the policy process would be more likely to know who they are Congress redistributes resources, and centralization and analysis of information makes this much clearer (Schneier, 1970, p. 22). In

low information settings, policy decisions are often made by "coalitions of mixed expectations," where legislators join a coalition for varying reasons and with both different kinds and levels of information. As policy impact information is shared more widely, coalitions are harder to form since legislators will not support just any distribution formula (i.e.because they always support certain causes such as the elderly,) but will look at the more parochial interests as to how specific policy options affect the portion of the public they want to look out .8240 Such models have an UNLOCKING EFFECT in that it is now possible to ask different questions than when analysis was much more difficult. The possibility for "What If?" questions is greatly expanded. More policy options might be considered and POLICY QUALITY could be increased.

The Logic-based models

The logic-based models are broader in scope of their predictions and rely more heavily on initial agreement on the underlying assumptions of the models being used. The Congressional Budget Office (CBO) is a heavy user of a variety of commercial econometric models (Chase,Wharton,Data Resources Inc.) to predict general economic trends and policy implications. Such models are much more subject to political entanglements since they are extremely complex and based on a number of abstract assumptions. They tend to get tagged very quickly as "supply-side" or "demand-side" projections. Analysts often make up their minds first, then tout the model which agrees with their pessimism or optimism. CBO does not rely on any one model, but rather looks for a consensus in the various models and informs its judgement through bringing in panels of experts to evaluate the projections(Alice Rivlin, in U.S. Congress, House, Committee on Appropriations, 1983). CBO began offering the models and their evaluation as an attempt to balance the POWER of the Office of Management and Budget (OMB) which bolstered White House policy choices with the support of selective models. In one staff members words:

> The major impact is that everyone is better informed. Less is done by stealth on the Hill today than in the past.
>
> The presence of CBO estimates and projections has done a great deal to keep OMB honest. We have taken some of the "crystal ball" out of the process. We are all professionals who attempt to understand how and why our projections differ.

Computers deal better with empirical data which can be collected, coded and analyzed. One of the consequences of Congress having ready access to budget data and models which rely on empirical data is the fiscalization of the POLICY PROCESS. There tends to

be a "Gresham's Law" of information, where empirical, and especially monetary data tends to push out "softer" but often equally important non-empirical data which is not quite as amenable to computer manipulation. (Downs,1967,p. 207; Goldberg, 1981, p. 287) The "lure" of precise numbers as the basis for decisions could upset the basic role of Congress as a mediator of public value choices. While timely and relevant information can help a congressman make those decisions which contribute to the normative and political goals he desires to pursue, information alone-- and perhaps particularly computer-based information--does not replace the human judgment which we rightfully expect of elected officials. To the degree that public officials hide behind the outputs of modern information systems it is "an abdication of moral and legal responsibility" (U.N., 1983, p. 32).

There is also some indication that rapid access to up-to-date information has sped up the legislative decision-making process. Gone are the days of leisurely rumination over policies:

> In our computerized age there seems to be more pressure for instant response, more pressure to have a quick answer and less time to reflect. Sometimes, it seems that the senators don't have enough time to reflect. (Larry E. Smith, Senate Sargeant at Arms, in Burnham, 1984, p. b10)

It is difficult to determine whether the computer caused changes in the policy process and its outcomes, or whether it served more as a "facilitating mechanism" which arrived at a time when legislative demands and information resources were increasing, and it simply helped mask the impending information and work overload by allowing legislators to run faster while staying in place. Whatever the case, the current availability of computerized information has facilitated the democratization of Congress, helped the Congress gain back some of its legislative power relative to the executive branch, and provided more extensive access to some types of policy-relevant information.

RECORD KEEPING APPLICATIONS

While voting on legislation is only the last and most public stage in the policy process, it represents the final legitimization of policy decisions. The computerized electronic voting system installed in the House in 1973 changed both the administrative burden of recording and publishing votes, as well as the voting environment. If having House members vote electronically simply allowed the totals to be displayed and electronically captured for insertion in the CONGRESSIONAL RECORD, the EFFICIENCY implications would not be important enough to classify this use of information technology as a major application. It is the change in the decision-making process

which warrants its inclusion.

Electronic voting is a much easier way to record votes,that it has changed the POLICY PROCESS by increasing the number of roll-call votes significantly. When an electronic vote takes fifteen minutes versus close to an hour for the manual system, Members are much more willing to impose on the time of their colleagues and call for a recorded vote. (See Table 1.1) More recorded votes mean more opportunities for public posturing and increased awareness of POLICY CONFLICT. More recorded votes also mean that is is easier for constituents and organized lobbying groups to keep track of positions taken by individual Members. (Burnham, 1984, p. b10).

TABLE 1.1 OVER TIME CHANGES IN THE NUMBER OF ROLL CALL VOTES

	(Pre-Electronic Voting)			(Post-Electronic Voting)				
	90th (1967)	91st (1969)	92nd (1971)	93rd (1973)	94th (1975)	95th (1977)	96th (1979)	97t (198
HOUSE:								
No. Roll Calls*	478	443	456	632	810	1035	779	519
Percentage Change Since Previous Measurement	xxx	-8%	+3%	+39%	+22%	+22%	-25%	-33%
HOUSE								
No. Recorded Votes	478	443	649	1078	1273	1540	1276	812
Percentage Change Since Previous Measurement	xxx	-8%	+32%	+40%	+13%	+17%	-21%	-43%

*Includes only the "Yeas and Nays", quorum calls and "Recorded Teller" votes which were allowed only after 1970 are not included
**Includes both "Yeas and Nays" and "Recorded Teller" votes

	(No Electronic Voting)							
SENATE								
No. Roll Calls	595	667	955	1138	1311	1156	1055	966
Percentage Change Since Previous Measurement	+17%	+11%	+30%	+16%	+13%	-12%	-9%	-8%

SOURCES: Stevens and Richardson, 1981;Roger Davidson and Mary Etta Cook, "Indicators of Senate Activity and Workload" and "Indicators o House Activity and Workload" (1984) CRS

The internal POWER implications of electronic voting are a bit less clear. On the one hand, there is only fifteen minutes for party leaders to gather wayward Members and persuade them to support the party position. There is also considerably less opportunity for the presiding officer to string the vote out until all his supporters have had a chance to vote. On the other hand, the opportunity to monitor ongoing votes and pick out specific wayward Members who had either not voted or voted wrong provides the leadership as well as other interested parties to target those Members for special persuasion during the final moments of the vote. A number of staff members pointed out that computer monitoring of ongoing votes increased the vote monitoring because it was so much easier, it provided some persuasion information ("You are the only Democrat from [state] opposing us", and made the difference in a number of key votes. Knowing that they would be watched much closer, more an more Members are checking the tally board or getting on the terminals to make sure they are "not on the wrong side." The potency of ongoing vote monitoring can be seen by the strategies Members use to avoid it. Many Members wait until the last minute, or dash in to vote and dash out to avoid the pressure.

Policy-making in Congress involves the creation of policy coalitions. William Riker (1962) has argued that coalition managers will strive for "minimum-winning" coalitions since they have no desire to expend more effort or resources to modify legislation or provide "side payments" above and beyond what they absolutely need to win. One of the major limitations for coalition managers in Congress is lack of information on voting intentions. With the increasingly sophisticated monitoring of ongoing votes, we should see a POLICY PROCESS which is marked by more close votes and more intensive last minute persuasion attempts. Members will simply have fewer "free" votes where they can hide behind the anonymity of a voice vote.

CONGRESSIONAL COMMUNICATIONS

The U.S. Congress sits at the vortex of three discrete communications flows with external groups and individuals: it is the target, sender and subject matter of communications. As the target, members of Congress receive and sometimes solicit massive amounts of communications from constituents, interest groups and other governmental institutions. As senders of communications, Members have turned their offices into small public relations firms promoting only one product--their own political well being. As the subject matter of communications, congressmen and the Congress as an institution compete with other political actors for the positive attention, power and prestige which accompanys news coverage.

Internally, members of Congress and their staffs must find ways

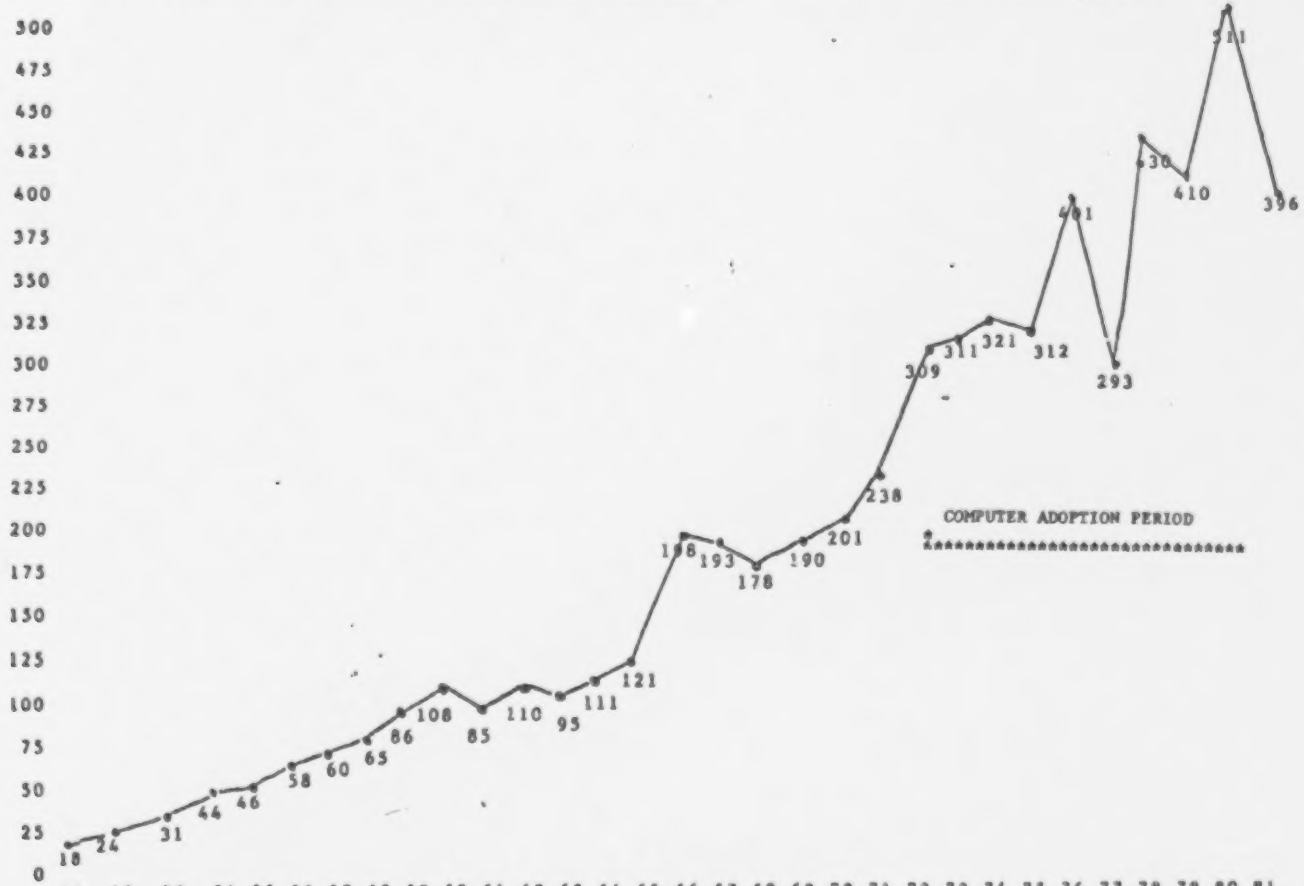
to effectively communicate with each other. They need substantive information to create policy,strategic information to form coalitions , administrative information to monitor and direct their offices, and oversight information to evaluate the executive branch.

Both internally and externally, congressmen are looking for the most effective ways by which to receive and send the most complete and relevant information. Changes in communications technology have opened new horizons for Members and their staffs, and in the process changed how Congress performs its functions. While it was once possible to clearly distinguish between computer-based and other communications technologies, the distinctiveness has almost evaporated and a number of technologies have been "married" in numerous ways to enhance communications potential.

Constituent Communications Applications

One of the driving forces, and a continuing prime rationale for introducing computers to Congress lies in the contribution technology can make to helping Congress deal with the significant burden of constituent mail. Traditional methods of dealing with each piece of mail individually consumed a great deal of staff effort (taking them away from other duties) and spawned short-cut (mimeographed information sheets, terse accompanying letters etc.) methods which lacked quality and often relevance. As the burden of incoming mail grew (See table 1.2) and as traditional methods of dealing with outgoing mail both overburdened the staff and facilities (the floors of the Senate office building where addressograph plates were stored began to buckle from the weight) the temptation of a technological solution became unbearable.

TABLE 1.2 THE VOLUME OF CONGRESSIONAL FRANKED MAILINGS, 1919-1981 (in millions of pieces)



SOURCES: 1919, Cover,1980, p. 125; 1945-50, Congressional Quarterly , 1976, p. 13;1954-1981, Bibby, et.al., 1982, p. 140.

The House and Senate approached the problem in two different ways. In the House, Members were initially allowed to use a small portion of their clerk-hire funds to purchase word-processing and mailing list services from outside vendors. The Senate on the other hand created a centralized computerized mailing list capability in 1970, and a much more sophisticated centralized Correspondence Management System a decade later. More recently House and Senate approaches have converged as the Senate has approved the installation of micro-computers in Senate Offices and the CMS system is on the way out except for Senators from very large states whose mailing lists will not fit on micro-computer disks. (U.S. Congress, Senate, Committee on Rules and Administration, 1983) The House Information System (HIS) ,on the other hand, after letting outside vendors service Member communications needs has created its own correspondence management system which it is offering like any other vendor to House members. (See Task #5 for a more detailed discussion of acquisition and adoption trends).

While the capabilities of various correspondence systems vary in detail, they all provide sophisticated word processing, the capability of inserting selected pre-written segments, personalization in the salutation and in some cases the text, and the ability to create targeted mailing lists based on information about the constituents interests and characteristics. Most systems provide correspondence records (mail counts on issues, automatic filing, etc.) and correspondence tracking.

The implications of automated correspondence systems cover a wide range of areas. The initial impact of communications was on EFFICIENCY as more mail was handled with less effort. The turn around time for incoming and outgoing letters declined dramatically in most offices. The quality of the outgoing product increased since word-processing encouraged staff to "smooth " correspondence more, and the repeated use of a set of interchangeable paragraphs encouraged staff to create a good representation of the Members views rather than simply trying to deal with the volume of original letters they had been saddled with. Fewer communications "fell through the cracks" as offices could trace communications.

By 1982, about 40% of House offices were filing their casework records on the computer. At the touch of a button, staffers could generate statistical breakdowns of casework activities. Many offices use a tickler system to inform themselves of cases on which responses are overdue from the agencies. (See Johannes, 1984, p. 221)

The darker side of the EFFICIENCY question is the fact that while computers were introduced to help Members respond to constituent requests and expressions of opinion, the capacity for creating

targeted mailing lists and the ease of responding to incoming mail has led to increased outreach and added cost. The UNLOCKING EFFECT of technology has meant that Members are soliciting more mail and sending out more specialized mailings to identifiable groups. Over 90% of the mail handled by the Senate CMS system was not a result of a constituent oriented request. Offices seek out lists from a wide variety of sources to bolster their mailing lists. Today constituent mail is less of a burden than an opportunity to begin a political dialogue. This can enhance REPRESENTATION:

> One of the great problems we face in the country today, in my opinion, is the feeling of diconnectedness between the citizen and the Government...What we have found to be very effective is this: When a person writes to me about a social security question; all right, I respond to that question...Six months later we have taken some action that affects social security. I now pull out the names of all those who have written me on that subject, initiate a response saying, "you wrote me recently about this, and there has been this modification on which I would like to update you." That has given us the opportunity to be more than just reactive...it tends to bridge the gap, the feeling of disconnectedness. (Senator Mark Hatfield,R-OR, in U.S. Congress, Senate, Committee on Rules and Administration, 1982, p 14)

On the other hand ready access to constituents through technology should increase the POLITICAL SECURITY of Members. Modern computers and high speed printers, in conjunction with their free mailing privilege, have increased the considerable advantages that Congressional incumbents always have enjoyed over their challengers. (Burnham,1984,p.b10) The power to inform also carries with it the potential to misinform. Ready access to constituents of known policy persuasion invites the dissemination of selective information. Personalization of communications walks a fine line between delivering personally relevant information and misleading the recipient as to the Member's level of interest and commitment to a narrow cause.

While computer technology has improved the efficiency and enhanced the quality of outgoing congressional mail, such technology is a two-edged sword. Increasingly interest groups are harnessing technology to fill the "In" boxes of the Members. Through what one practitioner calls "ad hoc constituency mobilization" (see Keller, 1982) thousands of seemingly personal letters can flood Capitol Hill in a matter of days. Through demographic targeting via computer potential letter writers can be identified and stimulated. Computer based printing technology produces letters with varying messages, letterheads and type faces simulating personalization. In the hopes of delivering the

messages at the right time, some groups solicit prior approval to use names and send out proxy letters over the "signatures" at the appropriate moment. If "turnabout is fair play," interest groups are using the technology popularized by Congress against them.

The introduction of computerized communications systems affected the JOB QUALITY of congressional staffs considerably. Its impact can be seen in the types of staff members offices look for, the nature of their jobs and their physical location. More and more offices are specifying positions as the "computer coordinator" and requiring computer literacy and familiarity of all new staff. In the House ,where funding for computer applications comes from clerk-hire allowances, Members must trade labor costs for equipment acquisition and are getting along with fewer than the eighteen staff allowed by House Rules. Physically , more staff members can be located in the district offices and still have access to the important information which was once only available on hard copy files in the Washington office. (See Table 1.3). As equipment increasingly requires space once occupied by

TABLE 1.3 DISTRIBUTION OF CONGRESSIONAL STAFFS BETWEEN WASHINGTON AND DISTRICT OFFICES

Percentage of Total Personal Staffs in District Offices

YEAR	HOUSE	SENATE
1972	22.5%	12.5%
1976	28.0%	n.a.
1978	33.4%	25.0%
1980	34.4%	25.4%
1981	36.1%	25.8%

SOURCE: Bibby et. al. VITAL STATISTICS ON CONGRESS, 1982 (Washington D.C.: American Enterprise Institute, p.112)

humans, some staff members are shifted away from the mainstream of office activity to annexes and computer "boiler rooms." The generalist staff member who at least occasionally "got a taste of the action is now chained to the terminal." Representative Charlie Rose (D-NC) paints a rather bright picture that technology will be "leaving my people free to engage in more substantive problems and responsibilities...We can give more attention to the human problem of being a Congressman" (GOVERNMENT EXECUTIVE, 1977, p. 46). His image is correct for part of the staff, but probably not for all. Research from a number of realms indicates that technology reduces the drudgery of upper level staff members (The legislative assistant who had to drop everything to put labels on the newsletters), and helps upper level support staff look good by having relevant information at their finger tips. However lower level clerical staff engaged in data entry will find a diminution in job quality (see U.S. Congress, House, Committee on Science and Technology, 1981, p. 630). Staff members responsible for keying in correspondence data for CMS found that they had to work odd hours to make sure they got one of the limited lines, could not leave their terminal for for than ten minutes at a time or they would lose the line, do repetitive tasks in which it was hard to see much meaning or progress, and in general felt that they had lost control of their work to the machine. While not broadly used in Congress yet, the natural record keeping capabilities of the computer invites monitoring of worker productivity and which may lead to an even less desirable work environment. Some have even argued that computer controlled pacing and work measurement may well be an invasion of a worker's privacy. (U.S. Congress, House, Committee on Science and Technology, 1981, p. 516).

Electronic Mail

Electronic Mail (EM) is instantaneous computer to computer communications which allows users to send and receive electronic messages. A number of congressional units have experimented with EM with varying degrees of success and their experiences will be covered in more detail in section #3. The most obvious implication of EM for congressional offices has been in facilitating the shift of staff from the Washington office to district offices (See Table 1.3). Traditional communications based on the mail meant a long time lag between initiation of an information request and an answer. Most offices turned to the telephone which was inconvenient for coordinating schedules with district offices in other time zones, difficult as busy people played "telephone tag", and inconvenient when the technology for sending hard copy materials over the phone lines was rather primitive. While still in the experimental stage by many offices, EM has changed the ORGANIZATIONAL STRUCTURE of offices by supporting fully functional district offices and increased office EFFICIENCY by reducing wasted communications time and allowing

district offices to handle a great deal of communications and personal requests directly in the office. In some offices, the ease of communicating electronically has had the UNLOCKING EFFECT of increasing the number of people receiving a message and in the process leaving all participants better informed.

Mass Communications Technology

As the subject matter of communications, Congress has been affected by the means by which its activities are publicized to the broader society. The shift from print journalism to the electronic media initially put Congress at a disadvantage and blurred the image of the institution and its Members. POWER shifted to the more "photogenic" presidency and coverage of Congress took a back seat (see Balutis 1976). In 1979, the House opened its doors to television, and through cable television (C-SPAN) its official proceedings are available to 20 million households. Section #3 will look at televised coverage of the House in more detail. At this point it is enough to say that televising the House has increased its visibility, image and probably POWER relative to the Senate and the executive branch; increased the POWER of some of its members; and increased the level of POLICY CONFLICT by providing a new outlet. It has reduced EFFICIENCY, at least as measured by the amount of time spent in session and informed a subset of the population so that they could demand more responsive REPRESENTATION.

OVERSIGHT AND GRANTSMANSHIP APPLICATIONS

In our separation of powers system, Congress is expected to scrutinize executive budgets and oversee the application of laws. Given the facility of computers with numerical data, it is natural that they would be used extensively in both creating and evaluating the budget. The Member Budget Information System (MBIS) provided by HIS allows the user to look at actual expenditures for previous years and get a feel for consistent patterns of surplus or deficit. The Program Review System developed by the Senate Computer Center takes the Office of Management and Budget tapes and identifies the line items for which each committee and subcommittee is responsible for. This allows the committees to know exactly what they are responsible for very early in the process and less can be slipped by with little or no review. During the Budget process, the Comparative Statement of Budgetary Authority (CSBA) tracks the president's budget as it goes through Congress to provide a "snapshot" of an appropriations bill at any given point in time. Each of these make the Congress better informed on its dealings with the executive branch and thereby increases its relative POWER. The fact that some new questions can be easily asked is an UNLOCKING EFFECT which could increase the POLICY CONFLICT in a setting where more people know the consequences of past and impending

decisions.

Less has been done in computerizing the non-empirical, and after the fact evaluations of government programs. Numerous pieces of legislation require executive agencies to report to Congress on decisions, activities,findings, plans, etc. The creation of the GAO Reports File helped agencies identify what was expected of them in terms of reports and gave Congress a notification of which reports they should be expecting, which reports had been received and flagging impending required actions. Such information improved the EFFICIENCY of the oversight process although did little to provide information in more usable form.

While members of Congress have general concern for the implications of policy, they have a special concern for their states and districts. The Geographic Reporting System provides information on the distribution of government funds on a regional, state, congressional district, or local governmental unit basis (U.S. Congress, Senate, Committee on Rules and Administration, 1980, p. 23). This allows the Member to improve his REPRESENTATION and may lead to increased POLICY CONFLICT as Members seek to rectify past disadvantageous distribution patterns.

In looking out for their districts, congressmen are not simply reactive, but increasingly proactive--seeking out ways to serve constituency needs. The Federal government distributes significant funding for demonstration projects and targeted grants. While congressional offices have traditionally been one source of information on what was available, the ability of a particular offices to identify an appropriate program was largely a hit or miss operation depending on the skill or luck of the staff. With the introduction of the Federal Assistance Program Retrieval System and eventually the GRANTS program, staff members has access to a data base which could be cross-referenced by subject-matter and program qualifications criteria. This improves the REPRESENTATIONAL capabilities of a Member's office and can not help but improve his chances for ELECTORAL SECURITY.

SOME OVERALL IMPLICATIONS

The above discussion only highlights some of the modern information technology applications used by the Congress. Table 1.4 outlines many of the applications milestones in chronological order, while Table 1.5 summarizes in Tabular form the conclusions of the previous section.

LE 1.4 MILESTONES IN CONGRESSIONAL USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

	KEY DECISION ON COMPUTERS	NEW COMPUTERIZED SERVICES
	First bill to create Congressional computer facility (H.R. 18428)	
		CRS automates Bill Digest Clerk's Data Processing office established (HSE) CRS computerizes first House calendar capability
	Passage of Brademas Resolution to study ADP uses (HSE) Passage of Legislative Reorganization Act of 1970 Subcommittee on Computer Services established (SEN) House Information Systems (HIS) created (HSE) Electronic Voting approved (HSE) Technology Assessment Act of 1972 creates the Office of Technology Assessment	LOC conversion of bibliographic control system to ADP
		LOC SCORPIO system developed CRS acquires commercial services such as JURIS, NYT Info Bank) Electronic Voting Operational(HSE)
	Congressional Budget and Impoundment Control Act creates the Congressional Budget Office (CBO) House Select Committee on Committees suggests more computer use	
	House Committee Order No. 23 authorizes transfer of $1000/mo.for computers from clerk-hire (HSE)	HIS creates Pilot Member Information Network (MIN) Senate provides terminals for all member offices
	House Policy Group on Information and Computers established	HIS creates Pilot member office support system Trial videotaping of chamber proceedings (HSE)
	Rules changed to allow Members to freely transfer office funds (HSE)	
		LOC converts card catalog completely to computer Televising of House proceedings operational--C-SPAN established Senate Correspondence Management System (CMS) operational
	HIS funds slashed	
	Use of Microcomputers as standard office equipment approved (SEN)	Senate micro-computer pilot project carried out All Senate offices desiring microcomputers wired and equipt HIS expands MIN data bases

CE: This is a selective and expanded version of the chronology developed Robert Chartrand and presented in a number of his publications artrand 1976a,1978 and others)

TABLE 1.5 The Implications of Specific Information Technology Applications on the Congress

	IMPLICATIONS					
APPLICATIONS	EFFICIENCY	ORGANIZATIONAL STRUCTURE			REPRESENTATION (POL. SECURITY)	PO
		UNLOCKING		WORKING CONDITIONS	POLICY PROCESS	
Bill Status System	X				X	
Legislative Analysis						
-Bibliographic Searches	X				X	
-Predictive Models		X			X	
Electronic Voting	X				X	X
Correspondence Management	X	X		X	X	X
Electronic Mail	X	X	X			
Televised House Proceedings	X				X	X
Oversight						
-Budget Tracking		X				X
-Geographic Reports					X	X
-Inter-branch Data Transfer		X				X
Grants Programs		X			X	
Personal Computers	X	X	X			X

X denotes significant impact in this area

An application by application approach to analyzing the implications of technology may well distort the more general pattern. In this final section I will outline the broadest implications.

COST: While some have argued that information technology would reduce costs, it is seldom the case. Either new costs are added, or the technology opens up new opportunities and volume increases overwhelm per/unit costs. For example the cost per piece of outgoing mail and the time expended on each roll call vote in the House are both down, but the number of pieces of mail and votes are up considerably. The best that can be said is that information technology has allowed Members of Congress do a better job in keeping up with an increased demand. We are making a better use of the human resources of Congress and they are approaching their decisions armed with more relevant information.

UNLOCKING EFFECTS: By making some tasks easier to perform and more feasible, information technology has allowed congressional offices to ask some questions and initiate some communications which would not have been attempted in the past.

ORGANIZATIONAL STRUCTURE: Information technology has had competing impacts on the organizational structure of Congress. There is little evidence of a consistent centralizing or decentralizing impact. Individual offices have become more decentralized through the proliferation in number and tasks of district offices, although technology was more of a facilitating factor than a cause. The lack of a consistent pattern of access to and control of information systems allowed both democratizing and centralizing influences to co-exist.

QUALITY OF WORK: Technology has affected the working of individual Members only marginally. Electronic voting and Televising the chamber are the closest applications to having a direct impact. The major implication of information technology has been on the staff, with some of them improving their lot through relief from drudgery and easy access to the information they are called on to provide, while others find themselves in a much diminished position lacking much of the glory and excitement of "working on the Hill."

REPRESENTATION AND POLITICAL SECURITY: There is little doubt that technology allows Members of Congress to do a better job of informing constituents and serving their needs. The ability to identify local implications and communicate targeted messages may well have had a parochializing effect. The consequences of improved communications and services is reflected in the continued advantage incumbents have in congressional elections. Even strictly following the requirements that allowances be used for "official purposes" only has meant that technology provides

another set of tools in the incumbent's bag.

THE POLICY PROCESS: While improved information emanating from technology makes a broader range of congressional decision-makers better informed, it does not necessarily--or even potentially--mean that the "politics" will leave the policy process and some higher standard of policy "goodness" will prevail among the newly enlightened participants. Facts alone are seldom overwhelming enough to sway major decisions. Facts are filtered through the values, goals and participants of the recipients who evaluate, specify and often interpret them before using them as ammunition in the policy battle. Far from reducing politics, information technology puts more relevant facts and strategy information at the hands of a broader range of congressional decision-makers, as well as expanding their potential for using communications technology to sway the final decision. While we might have an initial negative reaction to "Conflict" as opposed to "Consensus," policies which go through the forge of informed conflict will likely be much better than those molded out of ignorant consensus. To the degree that information technology allows more information to enter the decision-making process, final decisions should be better.

POWER: Ultimately a democratic political system based on a separation of powers requires democratic division of powers at all levels and relative equality of the branches of government. Information technology accompanied and may well have been a partial cause of the democratization within Congress. Power has diminished for those Members relying solely on their party and chamber positions , won often as much by longevity as capability, and devolved to those who know how to harness the new technology to reduce some of the ongoing tasks and gain access to new forms of information. On the institutional level, information technology holds great promise for Congress onging power struggle with the executive branch. On the state level it was found that "legislatures with developed information systems do indeed function more influentially vis-a-vis the executive and the bureaucracy" (Worthley, 1977 b, p. 427) and there is every indication that the same is happening for Congress. Congress has to go to the executive branch less "hat in hand" begging scraps of information, and is more often able to be in the more enviable position of being the information provider than the recipient.

While it is clearly dangerous to impute too much impact to any one change--even one that affects the core of congressional activity such as information technology--imputing too little effect is just as foolhardy.

TASK 2: Identification, Description and Evaluation of Congressional Information Technology Pilot Projects

THE PILOT PROJECT RATIONALE

A recommended technique for smoothing the transition from one technology to the next is to choose a limited number of individuals or organizations to serve as pilot project participants. Pilot projects serve two major purposes. As testing sights for new applications they limit the risk of technological change by allowing the organization to "look before it leaps" and identify some of the unanticipated consequences of change and to measure the degree of positive benefit. Secondly, pilots facilitate the fine tuning of software and the testing of hardware under conditions of more limited demand. Finally, pilot projects can serve as an integral part of an adoption strategy. Those units most oriented toward change begin with a supportive attitude which increases the likelihood of success and will serve as powerful promoters of the application. Where there is a great deal of communication and contact between organizational units, those in the pilot project often play constant host to representatives of the non-participants who want to see what they are missing out on.

Pilot projects come in a variety of forms:

FORMAL TESTS: Formal pilot projects come closest to scientific experiments. Those in the test become the treatment group, and those not the control group. Formal pilots require an unbiased selection of pilot participants in order to test the application across the widest spectrum of users as possible. Such pilots are most useful for assessing unanticipated consequences and measuring usage patterns. If they are very successful, they can effectively facilitate change, especially if formerly hesitant users are satisfied, since converts make powerful promoters.

INFORMAL PILOT: Informal pilot projects are less stringent than formal ones in that participants are not selected randomly and evaluation is often less comprehensive. Informal pilots are more likely to guarantee success since participants choose to be part of the project, or are chosen as a reward. In either case, they are less likely to condemn the application completely.

USAGE ASSESSMENTS: In some cases, pilot projects are really after the fact usage assessment. New applications are made available,and "run up the flag pole." After a suitable period of time, levels of use are measured to determine directly whether they fulfill a need or not.

BEFORE AND AFTER TESTS: Some technology applications

are system-wide and not really applicable to traditional pilot testing. Applications such as the Bill Status System, and televising House proceedings could not be done partially. While the hardware and software can be tested, the application is an all or nothing situation. In such cases, measurements of before and after behavior and perceptions serve as the evaluation technique.

THE USE OF INFORMATION TECHNOLOGY PILOT PROJECTS BY CONGRESS

Congressional information technology applications have seldom been preceded by formal pilot project testing. More often those Members demanding new services, or those on the committees overseeing information technology were given the opportunity to try out the application before others . As one staff member put it, "Congress is a very political institution, and political considerations apply to internal as well as policy questions."

Pilot project evaluations have also been rather informal. It is the rare case when the period of pilot testing was followed by a formal evaluation. There is is a tendency not to gather comparable usage statistics since HIS and the Senate Computer Center are very sensitive about being perceived as "watching over Member's shoulders." Beyond collecting some very general usage statistics, there has been even greater hesitancy to determine the types of offices using specific applications.

Given the general informal nature of pilot projects in Congress, it is particularly difficult to do any sort of cost benefit analysis. The costs of specific pilot projects are seldom separately identified, rather are subsumed on general operating costs. Only recently has HIS began to develop an accounting system for computer usage which could be used if it is ever decided that individual member offices should pay for the service they use (both CBO and the clerk's office currently reimburse HIS for some services). The lack of estimates is matched by the lack of benefit measurements. Much Congressional activity does not lend itself to empirical evaluation. In those area where per unit costs could be determined (i.e. the resources needed to produce a constituent letter etc.) the work pressures of the congressional environment discourage such accounting. The best data we have involves either random observations, or in some cases, formal surveys of participants.

SOME EXAMPLES OF INFORMATION TECHNOLOGY PILOT PROJECTS

CRS Issue Briefs(1973)

In 1973, the Senate Rules Committee asked for a set of brief reports on key issues and CRS decided to use their relatively new computer capabilities to develop and disseminate them. After a

fifteen month development period, CRS was ready to allow the six Senate offices in the pilot project on-line access. Issue briefs on-line "became a bestseller and CRS had a computerized product ready to sell as more offices get the necessary equipment." While there is currently almost complete access to the issue briefs on-line, in the over ten years since they were introduced there has not been a great deal of movement toward on-line domination of distribution. The hard copy reports are still the most popular. Staff members tend to scan the reports on-line, and then request the hard copy.

Pilot Member Information Network (1975)

In 1976, HIS provided 21 House offices (17 Member offices and 4 committees) access to the six data bases which then composed the Member Information Network (MIN) (U.S. Congress, House Commission on Administrative Review, 1977 b, p. 219) Participants were largely members of the Committee on House Administration which oversees HIS. Response to these new resources was quite positive and the MIN was off and running. The growth was quite rapid with over half the House membership on MIN within two years, and almost universal access currently. HIS has continually upgraded MIN with new data bases and services, some of which have gone through a piloting process. During the 99th Congress, eight new data bases will be added, bringing the total to twenty.

Pilot Member Office Support System (MOSS)

In 1976, six House offices became part of MOSS, giving them access to programs for letter writing, correspondence tracking, and mailing list creation through access to a time shared minicomputer (U.S. Congress, House Commission on Administrative Review, 1977 b, pp. 214-215). The pilot helped prove the applicability of information technology for correspondence management and encouraged more Members to allocate some of their clerk-hire funds for equipment.

Correspondence Management System (CMS)

In the late 1970's the Senate tested its Correspondence Management System on eleven offices. The test generally proved the utility of automating correspondence, and led to some refinements of the program to better fit senatorial needs.The Senate moved through a number of stages in automating mail. First providing mailing list management and then the adoption of an integrated correspondence management system (U.S. Congress, Senate,Commission on the Operation of the Senate, 1977 a, p. 25). A more recent pilot (see upcoming discussion) involving the use of micro-computers in Senate offices is likely to see the centralized CMS system largely phased out less than five years after it became fully operational.

Televised House Proceedings

While computer applications were integrated into the Congress with little fanfare and even less general discussion, the decision to televise the proceedings of the House was accompanied by a myriad of hearings, analyses, speculations and debates. At least three pilot type projects preceded the final decision to televise in House. In 1975, The Ad Hoc Subcommittee of the Rules Committee on Broadcasting invited the networks to carry out a technological feasibility study of the House chamber to determine whether broadcast quality pictures could be acquired under present conditions. Their conclusions were largely positive, indicating that anticipated lighting changes would be adequate and that coverage would not be intrusive (Garay, 1984, p. 89). A similar technological feasibility study of the Senate chamber in 1977 came to the negative conclusion that current light and sound levels in the Senate chamber were inadequate, and that the glare and intense heat produced by alternative lighting schemes was unacceptable (Garay, 1984, p. 95). A follow up study in 1981 conducted by network personnel indicated that current low light cameras would require more minimal upgrading of lighting which would not cause discomfort and that the upgrading of the audio was fully feasible, although expensive (Garay, 1984, pp. 121-122; U.S. Congress,Senate, Committee on Rules and Administration,1981, p. 16). These technical pilots had a significant effect on the adoption of televised coverage. The positive report for the House smoothed the way for coverage, while the initial negative report for the Senate slowed down adoption.

After considerable disagreement over the specifics of who should control the cameras and the signals, the House began a 90 day pilot test of an in-house distribution of televised chamber proceedings on March 15th 1977 (Garay, 1984, p. 97).

On the basis of a 90 day pilot project of closed circuit coverage of the House in 1977, the Select Committee on Congressional Operations found that broadcast coverage was technically feasible, stimulated a great deal of interest and support among Members and the public, provided Members and staff useful information as to what was going on, and did not seem to significantly alter behavior on the floor in a negative manner. A follow up survey of the Members indicated almost unanimously positive reactions. (U.S. Congress,House,Select Committee on Congressional Operations, 1977)

The direct costs of the 1977 pilot were minimal. Surveillance cameras came from current stock, and some equipment was lent by vendors hoping to get the House contract. While the project required the time of many House staff members, it was a matter of reallocating duties rather than additional costs. Overall the direct costs of the project were $17,945 ($14,000 of which was

for video casettes) (U.S. Congress, House, Select Committee on Congressional Operations, 1977, p. 21).

Once full fledged televising of Congress began in 1979 both academics (Robinson, 1981, p. 68) and the House Administration Committee (Garay, 1984, pp. 141-142) conducted surveys of the Membership which confirmed that the reaction was generally positive (See Task #3 for more details).

House Electronic Mail

Electronic Mail promises to increase the efficiency of congressional communications by more effectively utilyzing the time of staff and increasing the speed of communications (See Task #3 for a fuller discussion). In 1980, HIS entered into an agreement with Dialcom, a commercial vendor, to offer electronic mail services through the Member Information Network. In order to encourage use, the vendor initially subsidized the cost. While use spread slowly, it soon became clear that the $150,000-$200,000 per year price tag was going to be too much. The timing of cost estimates and probable trend lines came just as HIS was having its funds cut in the budget cutback of 1981. HIS was particularly vulnerable since it had been growing at such a rapid rate compared with other committees and support services, and it was more acceptable to "cut machines rather than people." HIS then shifted gears to develop and enhanced in-house version of electronic mail. The pilot project experience proved that electronic mail was a viable service, particularly if it could be integrated with other MIN data bases. The initial decision to go with an outside vendor had a residual impact. The shift to an in-house system had to be relatively transparent to the users since HIS did not want to turn off former Dialcom users by requiring intensive retraining. The transition to an in-house system took about one man-year of effort and used the basic Dialcom format while adding features particularly applicable to congressional needs. The HIS staff served as the initial target audience for testing the new system. (See Task # 3 for a fuller discussion)

Videoconferencing Via Satellite

For an institution which requires the influx of information from a wide variety of geographically dispersed experts and ordinary citizens, videoconferencing provides a viable alternative to bringing the participants to Washington or transporting the congressional participants to remote areas. In 1977 and 1978, NASA funded a series of videoconferences involving Members of Congress, their constituents and panels of experts. The evaluations of the participants were quite positive pointing out that this technology provides an efficient way to interconnect members of Congress with expert and lay witnesses . (Wood, et. al., 1979)

While technologically feasible, Congress has done little to capitalize on the potential. The inertial forces against changing a process which seems to work, the inconvenience of having to get people to the appropriate studios, or procure the necessary equipment and the cost factor, all seem to have played a role in discouraging use.

Senate Office Automation Pilot

One of the most extensive evaluations of computerized office equipment for the Congress took place - in the Senate during 1983. After a number of complaints by Senate offices that there was a general need to go beyond the centralized Correspondence Management System to provide more tailored services, and the particular need to provide more efficient word-processing than the line editor on the ATMS system, the Committee on Rules and Administration chose twelve offices to participate in the pilot project (a thirteenth office joined the project with their own resources). Offices were chosen for inclusion based on previous expressions of interest and the submission of a detailed plan outlining needs, personnel to be affected and an estimation of productivity increases. Each office was allowed to use $2000/month of services from one of six vendors for a period of nine months.

Although there were minor equipment delays and training problems, the evaluations were generally quite positive:

> Since the installation, there has been a marked increase in staff efficiency and better use of staff time...Staff is less resistant to edit documents, final copy is much cleaner, and turn-around time is improved. (Senator James McClure, in U.S. Congress, Senate, Committee on Rules and Administration, 1983, p.287)

> It has dramatically changed the way we work. The system has enabled staff to spend less time on clerical functions and more on creative ways to deal with our constituents...We are now saving about 15 hours per week in clerical time. Files that never got attention are being organized, and the professional staff is being supported as never before. I wonder how we ever lived without it. (Richard Yurko, executive aide to Senator Bill Bradley, quoted in Rifkin, 1984, p. 46)

While designed as both a general test of micro-computers in Senate offices and an evaluation of particular vendor products, the vendor evaluations were less conclusive. Offices tended to like the equipment with which they have become familiar. In some cases vendor generosity compromised the test since they provided more services than the $2000/month allotted (U.S. Congress,

Senate, Committee on Rules and Administration, 1983, p. 288).

The pilot project became more than a test and took on the character of a demonstration project which helped sell the applications. "Each office in the pilot had a constant round of visitors from other offices who wanted to get in on the new technology." Interest in viewing the new applications spanned the whole range of participants from lower level staffs to the Senators themselves.

The approximate $200,000 price tag of the pilot seems to have been worth it. The Committee on Rules and Administration approved micro-computers as standard office equipment to be provided out of general office support funds. Three vendors were finally approved after an evaluation of requests for proposals and over eighty Senate offices have already had equipment installed, or are on the waiting lists.

Other Current Pilots

The above brief descriptions only touch the surface of the pilot and quasi-pilot projects authorized by various congressional sub-units. For example, sensing the need to improve the quality of transmission of both voice and data over telephone lines, HIS is currently expending $100,000 to connect 150 House offices to public Data Networks (Telenet and Uninet which transmit messages from "node to node" and check the quality along the way. While there is little expectation that this will save money, it will improve the quality dramatically. A number of House committees using DEC systems (under the lead of the Committee on Science and Technology) are experimenting with automating forms to reduce data entry. Some of the sub-committees of the Senate Appropriations Committee are making operational systems for getting budget information directly from the agencies.

In a fast moving area such as technological change, and particularly in an institution such as Congress where decisions are extensively decentralized, trial applications, informal pilot projects and more formal experiments are continually going on. No one wants to be left in the backwaters of technology, and there is little time nor motivation for coordination. Pilot testing can help avoid the most obvious shortcomings of new applications, but the selection of participants based on expression of interest or political position mean that pilots will not serve as definitive tests of what Congress needs and wants from the world of technology.

TASK 3: An In-Depth Look at Selected Congressional Applications of Information Technology

INTRODUCTION

It is difficult to select a limited number of representative applications to give a more detailed picture of the potential and pitfalls of introducing information technology to a political institution such as Congress. The specific applications selected for inclusion represent the best judgement of a variety of congressional observers in order to sample a broad range of applications which have had positive and negative consequences.

ELECTRONIC MAIL FOR THE CONGRESS

Members of Congress and their staffs spend a great deal of time communicating with each other and with individuals on the outside. The ability to communicate efficiently and quickly should have great appeal for Congress. Electronic message systems supported by computers seem like an ideal answer to some of the congressional communication burden. While readily available and heavily used in the business realm, electronic mail use has grown relatively slowly within the Congress, and its spread has been uneven across categories of users. HIS provides a quite sophisticated system as part of the Member Information Network, while the Senate System is more cumbersome and less used. Senate Offices are moving more toward Local Area Networks (LANS) via microcomputer to link specific committee staffs and to communicate within member offices and to state offices. Some congressional sub-units (committees and support agencies) use electronic mail heavily, while others rely on more traditional methods. Before looking at some specific applications in more detail, it is important to describe electronic mail and outline its general advantages and disadvantages.

What is Electronic Mail?

Electronic mail is a method of sending and/or receiving messages via computer terminals. It may involve an in-house network, or the use of a commercial vendor (Dialcom, U.S. Postal Service's ECOM, etc). While electronic mail can be used in a "conversational mode" (users interact on a "real time" basis), it is most often used to leave a message in an "electronic mail box," to be read at a later time. Electronic mail systems range from the simple sending and receiving of mesages, to more sophisticated systems which allow the integrating of a number of data bases and editing their contents into an electronic message, filing systems, and systems for determining whether or not a sent message has been read .

The Purported Advantages of Electronic Mail

Members of Congress and observers of the Congress point out that electronic mail has the following advantages which have

particular applicability to Congress:

-EM increases the efficiency of busy people (especially the professional staffs of Congress, by reducing the time-consuming annoyance of "telephone tag."

-The time zone differences between Washington and district offices reduces the "communications window." Electronic mail allows you to send and receive messages on your own schedule.

-EM can reduce paperwork. For example, the House document room takes document requests via EM, and uses the printout as a mailing label to return the requested document.

-EM "virtually eliminates the problem of delayed and lost memoranda" (Senator Gordon Humphrey, in U.S. Congress, Senate, Committee on Rules and Administration, 1983, p. 280)

-The electronic "cut and past" capability of some systems increases efficiency of communications by allowing the user to extract information from one data base, edit it, add a commentary and mail it off without having to rekey in the original information.

-There is some evidence that EM carries more "potency" than r790egular communications. Recipients treat it differently. Whether this is inherent, or a short term reaction to the newness, is still an open question. The fact that many systems allow the sender to determine whether the communication has been read may contribute to the effectiveness, since the recipient can't say "Oh, I never got your message."

Some Purported Disadvantages of Electronic Mail

While improving efficiency, EM does carry with it some endemic potential problems which must be considered:

-One of the major limitation of electronic mail is the fact that you lose the nuances of face to face communications. Non-verbal communications (gestures, facial expressions, social amenities, etc.) are not only missing, but may be wrongly inferred from an EM communication. A short and to the point piece of electronic mail may be seen as curt and abrasive when that was not intended. The very personal and social aspects of political bargaining do not translate well into electronic mail.

-One of the dangers of electronic mail is the potential for over utilization. It is just as simple to send five messages as fifty, so the distribution list gets wider and people may be receiving more information than they need. As Kenneth Olsen, president of Digital Equipment Corporation lamented, "I once printed my electronic mail at home and got 25 yards

of mail." (U.S. Congress, Senate, Committee on Rules and Administration, 1982, p. 10)

-EM may change the tone and content of communications. Research has shown that electronic mail tends to lead to longer, more self absorbed and more impolite communications (Czajkowski and Kiesler, 1984, p. 33).

-The equipment and training necessary for EM communications could limit those who could realistically communicate with the members of Congress. EM could exacerbate the division of society into the information "haves" and "have nots". Congressional offices, staff members, constituents or outside groups might find themselves outside of the communications "loop" if they did not have the resources, interest, or ability to communicate via EM.

-EM can circumvent traditional communications channels and affect organizational control. Where phone responses from agencies or congressional support organizations are seen as more tentative and clearly have not gone through the normal review process, an EM message captured on paper seems to have more official weight.

-EM opens up some significant security and privacy questions. From a security perspective, it has not been established who owns the messages on an EM system, how search and seizure laws apply to them, and who is responsible to see that the data is not used for unauthorized purposes (U.S. Congress, House,Committee on Science and Technology, 1984, p. 21). Although most EM systems are password protected, this may not stop the unauthorized user. In 1983, the FBI discovered a group of "computer hackers" who had penetrated Telemail, an electronic mail system used by a number of large corporations as well as government agencies such as NASA and the Department of Agriculture. While it did not seem that any major damage was done, NASA had some messages destroyed. (U.S. Congress,House, Committee on Science and Technology, 1983a, p. 476) From a privacy perspective, EM provides a vast data base which can be used to audit employee productivity or search for potential wrongdoing:

> In one Federal agency the in-house investigative staff on at least three occasions obtained a complete printout of the electronic mail system...On at least one of those occasions an outside law enforcement agency was involved. In effect, several hundred workers who use electronic mail in the conduct of their business had all their computer records read, and in at least one instance an individual was intimidated. The privacy of the workplace records of hundreds of people had been invaded and hundreds of people were caught up in an investigative sweep without any recourse to protect themselves. (U.S. Congress,House, Committee on Science and Technology, 1983a, p. 449)

Willis Ware of the Rand Corporation paints an even darker

picture of EM creating a "paper trail" of both the substance of a persons communications and a pattern of relationships of whom is talking to whom:

> You must not think of electronic mail as solely the electronic analog of an envelope...at the moment there are some 600 messages in my electronic mailbox...it represents the written record of my conduct of business...I can organize all those messages into folders and files, and so the system becomes a comprehensive, automated, file system with information retrieval. Anybody that had access to that body of information might as well have access to my office safe...My view is that computer matching that we have seen so far will be nothing compared to what might arise when somebody thinks about comparing files from electronic mail systems And I would point out that this is only the beginning because behind electronic mail comes voice mail, which will have all of the same attributes, plus some additional ones, such as ready recognition of the speaker. (Willis Ware, Rand Corporation, in U.S. Congress,House, Committee on Science and Technology, 1983a, pp. 451-452)

As is commonly the case with assessing technological impact, the greatest hopes are seldom reached, and luckily the greatest fears fail to emerge. The above listings are intended to be suggestive, but not exhaustive of the kinds of considerations Congress should have been taking into account when deciding on a application such as electronic mail. Unfortunately, electronic mail, as many similar applications, was adopted more on the basis of technological feasibility than any clear discussion of advantages and disadvantages.

SOME ACTUAL APPLICATIONS OF ELECTRONIC MAIL IN THE CONGRESS

Some Successful EM Applications

The most extensive use of EM occurs in the House under the system developed by HIS. Usage varies dramatically from one congressional sub-unit to the next.

USAGE WITHIN HIS

After attempting a pilot project EM system in 1981, HIS developed an in-house system which was initially tested on HIS staff and is now available as part of the MIN. The environment for a successful application was close to ideal. Equipment was generally available to increase convenience. The upper levels of the organization promoted the change and discouraged a redundant communications system (hard copies to back up EM messages) making it advantageous to use the system. Non-users were gently chided

that "If you had read my electronic mail message you would know what this is about." Today more people are communicating more effectively. The number of formal memos written has decreased. Meetings are not scheduled until the messages status feature indicates that everyone has read the background material. As one staff member described it:

> The initial introduction of EM was a bit painful. HIS staff members without a terminal on their desk or hesitant to use one found it inconvenient and held out. After a series of missed meetings announced through EM, the holdouts came around out of necessity. The initial complainers are now some of the most ardent converts who can not imagine how we ever got along without it.

GENERAL MEMBER OFFICE USE OF EM

The EM system used by HIS staff is the same one available to Member offices through the Member Information Network. As described by a staff member, the capabilities are quite sophisticated:

> The existing MIN electronic mail system is quite flexible. For incoming mail a user can browse by name of sender,organization of sender,date of transmission, length of message or a brief description. Messages can be read, ignored, and/or saved in a file. Incoming messages can also be sorted by sender and date. Outgoing messages can use material from other MIN files and be edited on line. Messages leaving the originating organization will be flagged to make sure you are satisfied with sending such a message. A message can be sent to an individual showing up in the on-line mail directory (using that persons resource identification code--generally first letter of the first name followed by a period and the last name), or you can create a customized distribution list and save it for future use. Your sign on message tells you the status of messages in your electronic mail box, and you can trace the disposition of message you send out. For filing purposes, it is possible to print a hard copy of any message.

After a bit of a false start using a commercial system, EM has shown a steady, if not spectacular, pattern of growth during the last two or three years. Currently over 400 Member offices use it to some degree with over 1500 different mailboxes used daily. Primary use is to link Washington to district offices. Over 41% of House offices report such usage, but only 3% of all offices see EM as their primary communications link with district offices(U.S. Congress, House, Committee On House Administration, 1984, p. 13). While usage patterns indicate a relatively high

adoption rate, among all HIS services, it also has the highest dropout rate. Thirty-two percent of the offices originally using EM have discontinued usage. A number of factors seem to have led to the disenchantment of many offices. Lack of computer terminals on every desk often makes EM an inconvenience. Their is still not a "critical mass" of regular users. EM requires that you must have someone with whom to communicate. If those with whom you want to communicate are not users, or more critically if only part of them are not, EM may add to your burden requiring redundant communications techniques to reach everyone.HIS has adopted the philosophy that EM should facilitate current lines of communications, which means that EM does not give anyone a new conduit to someone they could not communicate with before.

In order to "sweeten the pot" and encourage EM use, HIS has linked EM with access to some desirable services such as ordering materials from the document room, airline tickets, and especially access to the UPI Newswire service which makes newspaper clipping almost obsolete. As one staff member explained it, "We made EM 'lappy',.We put it in everyones lap and the Newswire showed its immediate benefit."

The implications of EM for Member offices are beginning to show. It has facilitated staff decentralization into district offices where they are no longer isolated from key information sources. When combined with computer storage of information, one staff member predicts that this will allow the House to "avoid building another Hart building." The ultimate potential for a nation-wide congressional communications network linking staffs no matter their location, connecting congressional offices with government agencies and giving direct access to remote data bases is still relatively far off (See U.S. Congress, House, House Information System,1979, p. 47).

COMMITTEE USE

A number of House and Senate Committees (especially the House Committees on Science and Technology and Energy and Commerce; and the Senate Appropriations Committee) have linked their staffs and members via EM. The staff points out that:

> Electronic mail works well for me when I am collaborating on writing a bill. I can send drafts back and forth and make the corrections. It sure beats trying to catch busy people on the phone or try to get another meeting off the ground.

Committee usage seems to work best when EM is mandated by the staff director. Voluntary adoption does not provide enough impetus for changing patterns, especially when there may be some initial training and inconvenience involved.

PARTY USE

The Republican leadership in the House uses EM to distribute whip notices and messages on the President's program. During the 98th Congress, 108 of the 166 Republican members could receive party originated messages over the MIN. The utility of such capability is hard to judge, since the same message is also delivered via hard copy to every office . The whip's office found that hard copies are still seen as the standard, it was not clear in many offices that the EM message was routed to the correct people.

SENATE USAGE

Electronic mail in senatorial offices has progressed much more slowly than in the House. The demand has not arisen independently, and there is no group such as HIS with a stake in promoting it. It is hard to beat the convenience of a phone system where you simply pick it up and the operator connects you. Senate task coalitions are very dynamic and there is no routine message routing which would display dramatic increased efficiency from EM. Senate observers feel that "EM will come, but it is not perfectly suited to the Senate. Intra office EM will come first, with much less potential for linking one Senate office to another."

Some Electronic Mail Failures

LEGISLATIVE LIAISON OFFICE LINKAGES

HIS has provided a number of executive branch legislative liason offices access to MIN for the purpose of establishing EM linkages. The Social Security, Veteran's Administration and Military Legislative Liaison EM linkages were established to facilitate casework. The usage depends heavily on the executive branch liaison and the structure of the agency. When the agency staff recognize the utility of EM it works well. The Veteran's Administration connection worked best since it can handle all types of cases centrally. Currently VA staff seem to be hardly aware that the capability exists. The connection with the Social Security Administration office in Baltimore was much less useful and has been discontinued since they were just one of many regional offices and could only deal with some of the cases.

The Department of Agriculture was given more limited access to the electronic mail capabilities of the MIN in order to share information with relevant committee members and staff. They tended to send out too much information. "Page after page of newsletters and press releases is just too much to read via electronic means."

When they were up and going and used appropriately, users were

quite positive about the ability to communicate electronically. More than one staff member echoed the observation that "Our electronic mail messages seemed to get them moving a bit faster than traditional letters or phone calls. It seemed like they took care of the electronic mail first."

Initial mixed results and technical difficulties may well limit the potential for more broad based electronic mail systems:

> Building an electronic mail system with the Senate or executive agencies will be a major task since it will involve one computer talking with another. This is much more difficult than working within one computer system. The pilot projects with executive agencies is not a true test, since HIS simply gave them one of their terminals and made them part of the system.

CONSTITUENT LINKAGES

The other real failure was the attempt to link congressional offices to individual constituents via electronic mail. Five offices were given electronic mail boxes to which they could have constituents direct communications. The Member office would then respond in more traditional ways. While some projected that this would give new meaning to representation by giving constituents timely access to decision makers, others feared the volatility of "electronic mob rule" and suggested that "if congressmen are to be the lightning rods of public opinion, lets hope to God there's a fuse on the end of it (Kenneth Showalter, in Miller, 1983, p. 21).

Both the hopes and fears seem to have been misplaced. The one office that got their system up and operating founding that there was relatively little use after the first few weeks. When that member was defeated, the project died. The public was just not ready, and there is just too selective a group from which to draw opinions. In order to be successful, it would take a much larger group of computer literate constituents and a great deal of promotion by Members to make any sense. So far no new requests have been made.

Some general Lessons from Electronic Mail Applications

FACTORS BLOCKING USAGE

Studying EM use in Congress highlight a number of the factors which discourage its use:

(1) EQUIPMENT SHORTAGES: Effective use of EM in any organization requires the availability of enough equipment so that it is easy and convenient to use. Having to go to another room and "bump"

someone else from a terminal clearly discourages use. Computer equipment in Congress was initially made most available to clerical level staff, whereas EM is most applicable to middle and upper level professional staff. Until terminals are in the hands of managers and analysts rather than correspondence managers, use will be retarded.

(2) COMMUNICATIONS TARGETS: In order to be useful, EM must link a person with those he needs to communicate. Until virtually everyone you need to contact has the ability and motivation to read the EM you disseminate, there is little motivation to use it. There is somewhat of a viscious circle. You need a "critical mass of users" to motivate others, but they may be waiting until the critical mass is already there.

(3) BEHAVIOR PATTERNS: Technology requires changed operating procedures. EM will not work until recipients get in the habit of reading their messages a number times each day. Interest is cooled if you have to call someone up to remind them to read their electronic mail. The EM link with the Airline Ticket Office almost died when they did not read their mail.

(4) NECESSITY: As long as EM is simply a redundant "add on", usage patterns are unlikely to increase very much. As long as hard copy communications duplicate what is available via EM, there is less motivation for using it. A viable EM system either has to provide information which is available in no other form, or it must allow the sender and receiver to manipulate the messages (file, monitor who has read them, integrate information from other data bases, etc.) in ways that are either impossible or more difficult using traditional means.

(5) TRAINING: The time pressures on congressional staff mean that computer training is just one more demand that can be more easily put off than the more pressing immediate concerns. The problem of training is exacerbated by the size and rapid turnover of staffs. The development of relatively simple systems which will not require regular updating will reduce the training problem . The bottom line though is that if a need is established, the motivation for training will follow.

(6) AWARENESS: Although HIS has promoted electronic mail diligently, many potential users are not aware of its availability or capabilities. A recent House survey of computer use (presumably overrepresenting a technologically sophisticated sub-set of staff members) still found 10% per cent of respondents not having enough information about the MIN EM system to know whether they could use it. House staff members interviewed in this research touted characteristics of the commercial systems relative to MIN when the existing House system could already do what they wanted.

(7) PROMOTION: EM clearly works best when it is promoted from the top. It takes a superior who refuses to read hard copy memos or cuts off a conversation and says, "Why don't you send me a mail message?",or chides a subordinate who asks a questions by saying, "Haven't you read my electronic mail message yet?":

> The office staff adjusted to the new system immediately in Senator Gordon Humphrey's (R-NH) office because of the top-down approach--the Senator insisted on getting all his messages electronically, and it left staffers little choice but to learn the system. (Rifkin, 1984, p. 46)

The story of electronic mail in Congress is one of considerable potential and selective heavy usage. The pattern of growth is evident, and congressional staff are sorting out the useful from the frivolous applications.

INTER-BRANCH INFORMATION SHARING AND CONGRESSIONAL OVERSIGHT

The Promise of Computers

In order to perform the oversight function, Congress needs timely, relevant and complete information concerning executive branch plans and activities. Computer technology makes it easier to transport information across organizational boundaries (Laudon, 1974, p. 61). Congress has always been dependent on the executive branch for information:

> Computer technology has enhanced the ability of Congressional committees to collect and organize information about the performance of individual agencies or the potential impact of proposed changes in social policy, possibly contributing to an increase in the power of the legislative branch in relation to the executive branch. (Burnham,1984,p. b10)

Or in the words of an actual participant:

> On balance, I think that Congress today would be a harmless debating society without the computers that enable it to keep track of the executive agencies. (Senator Charles Mathias,R-MD, in Burnham, 1984, p. b10)

Congressional access to executive branch information improves Congress position in at least four ways:

(1) The data arrives in far more detail than traditionally available in hard copy reports or committee testimony.

congressional specifications.

(3) The sharing of data files increases the quality of the data as users point out problems or mistakes and corrections can be made.

(4) The act of sharing alone may be enough to increase executive branch responsibility, whether or not Congress actually uses the data .

Some Preliminary Cautions

While open access to executive branch data is better than none, access may not be all that it is cracked up to be. In the first place, overblown expectations concerning the amount and utility of executive branch data may lead to disappointment:

> While there were millions of punched cards and thousands of reels of magnetic tapes, irregularly inventoried at best, there was very little that could be used in its present form...but there continues to be, in certain quarters, this almost mystical quality of wanting to believe that if we just had all that executive branch information, especially on line, how many great things we could do (Chartrand and Morentz, 1979, p. 42).

A second limitation involves the amount of data available, its format and utility for policy makers. Too much data can inundate the user. Under the guise of information sharing, executive agencies can inundate Congress with an avalanche of raw data which means little and discourages usage. A distinction must be made between raw data, and a higher level set of facts or observations organized into more meaningful "information." Congress generally needs information, not data. It is hard to imagine any congressional unit wanting invoice "data" from an agency, but aggregated into program expenditures over time, this data becomes useful information. It may not be as easy as it first seems to get relevant information from agencies. Data systems developed by executive agencies are designed to support their own needs and goals. If Congress relies too heavily on bureaucratic data bases, they might well have to accept their definition of public policy and the decision-making agenda (Chartrand, 1982, p. 379).

Finally, the ability of congressional staffs to independently analyze executive branch data may confuse the policy process as much as enlighten it. As one staff member commented:

> Too sophisticated a budget information system may not be all that it is cracked up to be. While numbers are important, in a political institution such as Congress

consistency of numbers is more important than details and absolute accuracy. Many of the decisions are less quantitative than qualitative. The Appropriations Committee out of necessity tends to budget at the margins--looking at the justifications for significant increases and decreases. Many of these judgements would be confused by too detailed information and are not really that conducive to electronic data processing. With everyone having their own spread sheet programs on micro-computers, the potential for differing numbers among members and between the sub-committee and the full committee is great. We might find ourselves arguing over differing spreadsheet logics and ferreting out data entry errors and losing sight of the larger picture.

TECHNOLOGICAL/DATA PROBLEMS

While information sharing sounds good in the abstract, some immediate questions concerning which data and in what format quickly emerge. While up and downloading of data is becoming increasingly possible across a wide variety of systems, getting different computers to "talk" to each other is still a formidable task. The problem is exacerbated by the lack of compatible equipment within , as well as across, institutional lines. Congress and its sub-units, as well as executive agencies and their sub-divisions, have generally moved into computerization independently.

Even if the purely equipment problems get worked out, getting the various participants to agree on standardization of software and data format is a significant hurdle. If an initial agreement is possible, there still must be some assurance that formats will not be c changed regularly. When you are dependent on others for data and they change their format, "your time-series data are all messed up and your would have been better off going it alone." While such standardization may be technically feasible, the custodians of executive branch data must serve their primary customers first (their superiors in the executive branch chain of command) and when a conflict arises, congressional needs take a back seat. Staff members attempting to make arrangements for data sharing point out that new agencies less set in their ways and those already heavily computerized are most likely to cooperate.

"REFORM 88" a Reagan initiative spearheaded by OMB serves as a good example of both a potential improvement in standardization and some of the difficulty in making it available to Congress.

Taking its cue from the Grace Commission that:

> The Federal Government is not effectively managing its information technology resources, and, therefore, missing out on substantial potential cost savings. The Government has failed to develop a coherent program for ADP planning and management.

Reform 88 was initiated to:

> develop a smaller number of up to date administrative, financial/accounting, payroll/personnel, property, and procurement systems, with common data elements to ensure the availability of consistent, Government-wide data upon which to evaluate operations and base managerial decisions (OMB, 1984, p. 38)

While just getting off the ground and aiming at a 1988 completion date, initial progress in developing modern, flexible generic accounting systems has been promising. Unfortunately there has been no coordination with the Congress to determine the most usable formats or information needs. The 54 page press release (OMB, 1984) describing the program emphasizes the need to coordinate government information gathering, analysis, and presentation, but proceeds as if Congress did not exist. While Congress would be better off without the panoply of agency information formats, it would be much better off if it had a role in designing the ultimate government-wide standards with which it will have to work.

Aside from standardization, information sharing is also quite dependent on the type of data with which one is working. Congressional units such as CBO have had more success in acquiring executive branch data via computer since budget numbers are so much more amenable to computerization than the kinds of evaluative information needed to oversee the actions of many agencies.

POLITICAL PROBLEMS

If the technical problems seem formidable, the political problems are even more so. While hackneyed, the assertion that "Information is Power," is no less valid. Both sides of the congressional-executive branch equation realize that giving up information reduces their strategic advantage. "The value of a data base often depens more on who may be excluded from using it than who may access it" (Michael Duggan, in Amara, 1974, p. 104). This is nothing new. Commenting on Bismarkian Germany, Max Weber observed that "officials would give the legislature only the barest minimum of information, because they regarded it as an assembly of impotent grumblers full of learned conceit and a drag on efficient operations" (quoted in Heaphey,1975, p. 479).

Aside from outright refusal to share information, executive agencies protect themselves from congressional requests by more subtle means. It is hard to ask for something if you do not know whether it exists. Although the Paperwork Reduction Commission called for a Federal Information Index, little progress has been made and agencies can continue protecting data bases through ignorance. Agencies also segment their data bases to protect the more sensitive materials. This is not entirely invalid. The concept of "executive privilege" in its broad application affirms the fact that individuals and organizations need "back areas" out of the public view where they can privately plan. Even within the executive branch there is not full sharing. Agencies probably would not object to OMB having direct computer access to their proposed budgets, but would protest OMB access to budget working papers. Smooth sharing of information with Congress is not likely to happen unless agencies accept that fact that Congress has a "need to know" particular information and that the sharing of it would not put them at a disadvantage.

THE CONGRESSIONAL CLAIM TO OPEN INFORMATION SHARING

While Congress oversight responsibilities are quite broad, Congressional protestations asserting the right to a free flow of information is tarnished a bit by its own behavior. Congress° stewardship of previously released information has often been enough to give the executive branch pause. When it comes to sensitive material, Congress "leaks like a sieve." Given the large number of participants and the wide variety of motivations, it is difficult to control the dissemination of information by the Congress.

Congress' own reputation as an information manager also makes it difficult to point an accusing finger at the executive branch. Congress does not freely share information within itself. The Senate Computer Center and the House Information System do little more than share the most basic data (especially bill status information) and keep each other appraised of new activities. For a number of years the various support agencies were subscribing to the same data bases and models with duplicate payments and little coordination (U.S. Congress, House, Committee on Appropriations, 1984, p. 56). Administrative units within the Congress bargain with other units for concessios before they share information. HIS desire to provide House offices with current office account data on line ran into the demand by the House Finance Office that they would only do so if offices kept them up to date as to when funds were obligated. The willingness of CBO to use the existing services of HIS took a number of years and required a detailed memorandum of understanding to assure as one senior staff member put it, "the responsiveness...we would get from a commercial vendor" (U.S. Congress, House, Committee on Appropriations, 1983, p. 233.) Within congressional units,

sharing is often blocked by partisan divisions. In the words of a minority staff member, "The majority is just not supportive of the minority's information needs. In a setting where information is power, we are just not going to be victims of majority tyranny. We will just go out and build our own data bases."

Congress may be a little more sensitive to the problems of information sharing after their experiences with the Carter White House. Through the Vice President't's position as presiding officer of the Senate, the White House got access to the SCORPIO and Bill Status files. They then proceeded to share the information widely within the White House and created a data file on every House and Senate member including political, demographic and behavior profiles. This allowed them to target and "pick out the Members who are 'gettable'" (Hager, 1978, p.2). After feeling that they had been "wounded by their own weapon" a memo of understanding was written with Vice President Bush that this would not happen in the Reagan administration.

Thus, while information sharing seems simple on the surface, reality has been marked by numerous pitfalls and missteps. In a few areas it has worked relatively well.

Some Factors Which Facilitate Inter-Branch Information Sharing

AUTOMATING EXISTING EXCHANGES

It is easiest to exchange computer tapes or data bases when the hard copy version is already being shared with Congress. Since the late 1970's, OMB has sent CBO its budget tape in advance of printing the hard copy. This allows OMB to begin its analysis immediately and prepare the reports Congress wants in a timely manner without having to rekey in all the information (Bob Harris, in U.S. Congress, House, Committee on Appropriations, 1984, pp. 109-112).

QUID PRO QUO

It is easier to get something from someone if you have something to give in return. The original sharing of the Budget tape was facilitated by an agreement to provide the White House with a copy of the tape used to type up the floor votes in the CONGRESSIONAL RECORD.

POLICY SUB-SYSTEMS

In certain policy areas there is a great deal of staff and expertise interchange. A number of staff members pointed out the defense appropriations process where the data is already highly computerized, and staff members shift back and forth among the various players (executive agencies, congressional support

staffs, outside interest groups) and bring along with them models, software and data bases. "It is a relatively closed community where we share more than we compete." If the closeness of these ties are what the participants perceive, there are some questions of separation of powers, and also suggest a danger of too much information sharing.

Active Promotion

Receiving Information from the Executive Branch requires aggressive demands by the relevant congressional sub-units. So far, Congress has been somewhat timid. A former HIS director set the early tone by saying' "We're exploring what information is available on their computers to see what they wouldn't have any objective to giving to Congress" (Frank Ryan in Cohen,1973,p. 380). Congress, and especially some sub-units, have become more aggressive in demanding information. The former staff director of the Senate Appropriations Subcommittee on HUD and Independent Agencies showed such aggressiveness in creating the Automated Budgeting Analysis System (ABAS).

> The Senate Appropriations Committee simply did not have the staff to create its own micro-computer based budgeting system. The staff director had to strong arm NASA, one of the agencies under his sub-committee to pay for both the hardware and software to get the ABAS system off the ground. NASA was willing to cooperate since it has a long-term relationship with the sub-committee and depends on it for its yearly budget. Unlike the authorizing committees which tend to deal with a different set of agency related issues each year, the Appropriations Committee sub-committees have a constant oversight activity involving one agency's whole budget.

The advantages of direct access to agency budget files through ABAS (Automated Budgeting Analysis System) would include the delivery of standardized data in more detail than now available through the main frame supported CSBA (Comparative Statutory Budget Authority) System. The data would also arrive more quickly and would allow the budget analyst to manipulate his own data file and try out different budgeting strategies. Such a system would require agencies to submit more standardized data and to be diligent about file maintenance. On the political side, many agencies do not want to submit too detailed budgetary data and might find this to be an intrusion.

The ABAS system has just been made functional at a time when the original promoter left. His successor is somewhat more sanguine about the potential which may limit its use.

Some Lessons On Information Sharing Across Branches

The experiences and observations chronicled above can be summarized in a few key lessons:

(1) Information sharing between the executive and legislative branches is more of a political than a technical problem.

(2) Data from the executive branch is only one piece of the policy puzzle.

(3) In order to get executive branch information, Congress must be aggressive and creative, but congressional sub-units will have to change their traditional pattern and provide a united front in requesting information.

(4) A belief in the utility of providing Congress with automated executive branch data bases is not shared by all potential congressional users. Active promoters are required to make an information exchange work.

TELEVISING CONGRESSIONAL PROCEEDINGS

While the above applications were subject to a minimum amount of pre-adoption analysis, the decision to open the House chamber to television cameras was the subject of years of debate, testing and analysis. Part of this was undoubtedly due to the fact that it would affect the entire chamber immediately , and in no small way by the obvious intrusiveness of the television camera. This is not the place to outline the adoption process (See Garay, 1984, for an extensive analysis), but rather to assess the implications of this technology.

Some Initial Hopes and Fears

Much ink was spillied and numerous hours of testomony and debate outlined the potential consequences of televising the House. Table 3.1 outlines the major advantages and disadvantages predicted by analysts and members of Congress. The table indicates those implications which have definitely turned out to be valid, those likely to be true, and those which seem not to have been borne out. In general, it seems that the prognostications emanating from the congressional support agencies and through the hearing process have largely been borne out, validating the process by which technological implications are projected by the Congress. Individual "crystal balls" may be cloudy or distorted,but the combination of projections give a fairly clear picture. The analysis which follows will emphasize perceptions and data relating to televising House proceedings which had the benefit of actual experience by which to judge the impact.

TABLE 3.1 ANTICIPATED CONSEQUENCES OF TELEVISING HOUSE PROCEEDINGS

PROJECTED CONSEQUENCES	EVIDENCE OF ACTUAL IMPACT	SOURCE
	++ = Clear Evidence of Impact ** = Probable Impact -- = Little Impact Evident	
CHAMBER BEHAVIOR		
More Speeches	++	(3)
Longer Debates/More Conflict	++	(3)
"Grandstanding"	**	(3)
Need to Consider Limiting Speeches	**	(3)
Improved Debate Quality	**	(3)
Better Scheduling	--	(3)
Increased Attendence	--	(3)
Discourage Revision of Remarks	--	(3)
PERSONAL VISIBILITY AND POWER		
Greater Visibility and Power for "Ttelegenic Members"	++	(3)
Decline of Commitees Relative to the Floor as the Decision Arena	--	(3)
Political Use of Material	--	(3)
INSTITUTIONAL POWER		
Televised Chamber Gets More Media Coverage	**	(1,2,4)
Congress Gains Power Relative to the Executive	**	(1)
IMPACT ON THE GENERAL CITIZENRY		
More Capable Voters	--	(5)
More Positive View of Congress	--	(1)
Stimulating Increased Political Activity	--	(3)

SOURCES: Projections as to the impact of television on Congress are scattered through numerous hearings,CRS Reports and floor comments. The following listing is meant to be suggestive rather than exhaustive. A more detailed discussion of projections is available in Garay, 1984, chapter 7.

1. U.S. Congress,Joint Committee on Congressional Operations, 1974
2. Graber,1980
3. Rutkus in U.S. Congress,House,Committee on Rules, 1978
4. Robinson,1975
5. Weaver, 1972

The House Television System

THE TELEVISION SIGNAL

The television signal emanating from the House comes from cameras controlled by House employees under the direction of the Speaker who sets policy with advice from an advisory committee. Generally, the cameras work from fixed positions covering only the official business of the House (although during 1984 the Speaker directed panning of the empty chamber during the "special orders" period in order to embarass conservative members who had taken advantage of that time to present their message). In general, whoever has the floor is on camera and the possibility of embarassing shots of other Members is limited. During votes, the screen is blackened. House offices get their signal directly from the House system. While the live signal is available to the commercial news media for limited use, and to any non-profit outlet on an unlimited basis. When assessing the distribution of House television, the primary, and almost exclusive distributor is C-SPAN (The Cable Satellite Public Affairs Network).

C-SPAN COVERAGE OF CONGRESS

C-SPAN is a non-profit network created by the cable television industry specifically designed to distribute the House signal.While House proceedings take precedence over all other programming, C-SPAN has expanded its coverage dramatically. When the House is not in session C-SPAN covered the presidential campaign, committee hearings, conferences and speeches. While the House is in session, C-SPAN provides gavel-to-gavel coverage with minimal commentary (limited to bottom of the screen "crawls" describing on-going actions and visuals and commentary during ongoing votes. While the extended C-SPAN coverage is significant, this analysis will be limited to the gavel-to-gavel coverage.

The Potential Audience

Estimating the potential audience for C-SPAN is tricky. As a cable television service, C-SPAN is available only to individuals with cable television and whose systems subscribe to C-SPAN. C-SPAN is currently being sent over 1650 cable systems to more than 19 million households (approximately 1/4 of U.S. households) and to over 30 million people. Growth of cable availability and systems carrying C-SPAN has been steady during the five years of its existence. Estimates indicate that by 1990, 62% of all American households will be wired for cable (Geltner, 1984, p. 30). Of interest to members of Congress is the fact that C-SPAN is currently available to some households in over three-quarters of all congressional districts.

While impressive, the above figures on audience potential

underestimate the actual figures. The dramatic growth of personally owned satellite earth stations makes it impossible to accurately measure audience potential through dealing with cable subscribers alone.

The Actual Audience

Although C-SPAN may be available in many homes, it is just one of the panoply of offerings facilitated by cable television. C-SPAN seems to draw a small but loyal audience. Although C-SPAN has been hesitant to estimate its audience, and has only recently contracted for a national audience survey, more geographically limited findings generalized to the national level indicate that over a quarter of cable subscribers had watched C-SPAN, eight per cent watched weekly, and one percent were daily viewers. At any one point in time, it is estimated that 250,000 are watching (Boakes,1983, p, 2;Garay, 1984, p. 143; Gladstone, 1984).

Audience Demographics

While numbers of viewers are important, the nature of those viewers may be more significant in assessing the impact of C-SPAN. C-SPAN viewers are clearly not a random sample of the U.S. population. In the first place, cable subscribers tend to be (1) younger, (2) better educated, (3) employed, (4) married, (5) child rearing, and (6) more affluent (Boakes, 1983, p. 21). The one survey analyzing the C-SPAN audience indicates that it overrepresented males, over 30 years of age, with high levels of education, white collar occupations and above average incomes (Boakes, 1983, p. 2). Given the day time programming of gavel-to-gavel coverage, we might also expect that it would also be more available to housewives and retired people (Garay, 1984, pp. 143-144). [A RECENT C-SPAN SPONSORED SURVEY CONFIRMS PREVIOUS RESEARCH THE AUDIENCE IS "UPSCALE" AND DISPROPORTIONATELY WEALTHY, EDUCATED AND MALE (C-SPAN, 1985).]

The fact that access to cable television, and thereby C-SPAN, could lead to a "knowledge gap" (Tichenor, 1970) has not been ignored by politicians whose constituents have less access:

> The economic realities of cable television, satellite broadcasting and the videotest services could mean that rural areas and the urban disadvantaged may not share the same benefits from the "communications revolution" as their more affluent urban and suburban counterparts...Communications services are vitally important to every American. Our increasing dependence on communications technology demands a national policy which will prevent our country from being divided into the "haves" and "have nots" in terms of access to this technology. (Senator Larry Pressler, R-SD, in NEW YORK TIMES, 1981)

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The fact that access to cable television, and thereby C-SPAN, could lead to a "knowledge gap" (Tichenor, 1970) has not been ignored by politicians whose constituents have less access:

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C-SPAN viewers are not only unique in terms of social

characteristics, but also in political activity. The three available surveys of C-SPAN viewers (Boakes,1983 based on a Philadelphia sample;Hall,1980 using a Norman Oklahoma sample; and a 1983 Arbitron survey) all concluded that C-SPAN viewers are much more politically active in doing such things as voting, contributing to political campaigns and contacting political officials. [The recent C-SPAN survey confirms the above and the fact that the C-SPAN audience is much more knowledgeable politically (C-SPAN, 1985).]

The existing empirical data on the C-SPAN audience is static. We have three surveys which are not strictly comparable since they deal with different samples, use different questions and were taken at different periods of time. There is little way to determine cause and effect. We essentially have a set of snapshots of a moving picture and do not know for sure whether viewing C-SPAN leads to increased political activity, or whether potential viewers with an established pattern of high political activity seek out increased political information and are drawn to C-SPAN, or whether there is a two way causal pattern. Lacking time-series data, the best bet seems to be that most of the increased involvement of C-SPAN viewers pre-dates their decision to view, but that some viewers could be drawn into increased political activity through exposure, and those already involved may well redirect their activity due to the issues and processes to which they are exposed through floor coverage. The importance of C-SPAN can not be measured solely by the size and demographics of its regular audience. Opinion leaders on all levels of government such as state legislators and federal bureaucrats watch. Although Washington D.C. does not currently have a cable system, over seven hundred office and residential complexes receive C-SPAN through the Capitol Connection service. The White House monitors Congress through C-SPAN and President Reagan has called in comments and mentioned watching in his news conferences. As one C-SPAN staff member put it, "Our audience includes the 'First Ear'."

OTHER FORMS OF DISTRIBUTION

Although the commercial networks showed considerable interest in covering floor proceedings, their use of floor footage has been quite limited. Part of this stems from union limits on using more than three minutes from a "non-legitimate" broadcast source, and partially from the nature of the coverage which fails to capture the type of visual excitement television has become accustomed to covering. Most network usage has included short speech segments to give "flavor" to a typical story using a stand up commentator.

The Impact of House Television Coverage on the Public

Experience with previous coverage of special congressional hearings (Senate Watergate Hearings and the House Judiciary Committee Impeachment Hearings) revealed that people liked what

they saw. According to the Gallup poll, live coverage led to a much more positive evaluation of Congress (American Institute of Public Opinion, August 29, 1974). The Philadelphia survey indicated that viewing of C-SPAN tended to increase understanding and support for Congress and its Members (Boakes, 1983, p. 2). Nonetheless, the positive effects are limited to that small, albeit important, segment of the public that watches. "As a consequence, negative opinions of Congress held by the majority of the non-viewing public, and fueled by the mass media are not likely to change" (Boakes, 1983, p. 87).

INCREASING PUBLIC AWARENESS

Using a sports analogy, Wober (1979) argues that traditional coverage of legislatures was like trying to reconstruct a football game and judge the caliber of the players by evaluating the post game interviews given. C-SPAN has the potential for informing interested citizens:

> C-SPAN is absolutely working a fundamental change in the Democratic process. People can really see the government at work, and technology will make it possible for this to be a smaller country than this was in 1776. C-SPAN will change Congress and cause better people to be elected...When people see the quality of the members...they will boot them out. (T.R. Reid, quoted in Geltner, 1984, p. 31)

Members are increasingly reporting that constituents are writing and commenting on having seen a particular debate.

Not everyone is enamored with C-SPAN's power in this realm. Representative Charlie Rose (D-NC) who advises the Speaker on policy concerning television has become increasingly agitated about expanded C-SPAN coverage and has banned C-SPAN from House offices. He fears that "the power to pick what committee hearings members of Congress watch is the power to set your own legislative agenda" (quoted in Gladstone, 1984).

PRECIPITATING CITIZEN ACTION

While is makes a great deal of sense that viewing congressional proceedings and absorbing background information would stimulate the desire to affect legislation more directly, there is little evidence to this effect. While some offices report mail motivated by House coverage, the general conclusion of outside observers is that the effect was more attitudinal than behavioral, The potential is there, but the linkage between watching Congress on television and trying to affect the outcome has not been proven.

The Consequences for the Chamber and Its Members

DIRECT BEHAVIORAL CONSEQUENCES

Increasing the Volume and Quality of Floor Speeches

The common assertion that televising the House chamber would tempt members to speak more and longer for "home consumption" seems to be borne out by a variety of empirical measures. The number of one minute speeches increased threefold between 1977 (two years before television coverage) and 1981 (two years after coverage began) (Davidson and Oleszek, 1981, p. 138). Lately, "special orders" at the end of each legislative day have increased dramatically, particularly as a tactic used by a small band of conservatives to garner public attention to their cause. The number of pages in the CONGRESSIONAL RECORD (Garay, 1984, p. 138), the number of pages per measure passed and the amount of time the House spent in session each day increased dramatically from the pre-television period (Robinson, 1981, p. 68). An early survey of House Members found that while few felt that coverage had affected their own behavior, a large majority (86%) felt that their colleagues had been giving more speeches, while 48% felt that more amendments had been introduced (U.S. Congress, Senate, Committee on Rules and Administration,1981 a, p. 115).

While the quality of speeches is more difficult to judge than the quantity, a number of observers point out that television spawned more brief and tightly organized speeches designed for the evening news (Roger Davidson in U.S. Congress, Senate, Committee on Rules and Administration, 1981a, pp. 153-154).

While numerous observers predicted increased "grandstanding" for the television cameras, this is impossible to prove. Grandstanding is as much in the eye of the beholder as an empirical fact. There is some indication that more Members are using visual aides to prove their points (everything from charts and graphs to a Miss Piggy nose have shown up on C-SPAN).

Increasing the Level of Policy Conflict

By broadening the audience, television may well make it more difficult to compromise after making a very public commitment (Graber, 1980, p. 210), and may make it worthwhile to pursue a conflict for external consumption well after the internal battle has been lost. Robert Walker (R-PA) one of the "guerrilla" conservatives using the "special orders period" most regularly argues that "if we can make the issue a contentious one, then we will have a larger audience. C-SPAN is a new tool in the congressional arsenal. Any member of Congress who hasn't noticed it hasn't been awake" (quoted in Gladstone, 1984).

The initial survey of House Members concerning the impact of television verified the increased conflict theme. Thirty-seven

percent perceived debate as being more partisan and 22% felt compromise had declined (U.S. Congress, Senate, Committee on Rules and Administration, 1981a, p. 190.)

Other Behavioral Implications

Many Members used the closed circuit television as a method of monitoring debate while engaged in signing letters or other activities. This contributes to efficient use of time, but may discourage floor attendance. Michael Barnes (D-MD) focuses on the positive effects of informing Members when he observes that

> I have the feeling that history may conclude that Congress finally figured out what it was doing when TV came to the chamber. It used to be that all the representative knew about the vote he was running to cast was that "if it's Tuesday, this must be fisheries management..." [Now] if the member is in his office...he can leave the television turned on...and follow what's going on...I think the case can be made that Congress has finally found a way to keep up with itself (Barnes, 1979, p. A21).

INDIRECT IMPLICATIONS

Increasing Public Knowledge About Members

Television is a demanding technology focusing on visual characteristics, enhancing vibrant speakers and highlighting certain shortcomings. Those Members whose position and/or abilities demand coverage will gain in public recognition and repute. While low public awareness of Members of Congress (even their own) has discouraged national pollsters from including such recognition questions, certain identifiable Members have already gained an increased public image:

> C-SPAN [has] turned the image of Tip O'Neill holding a gavel into a picture as familiar to its viewers as the MGM lion... (Kaplan, 1983, p. 128)

> Congressman Jack Kemp (R-NY) was recently stopped on the beach in the Virgin Islands and asked, "Aren't you a congressman? Do you know Bob Walker?" Bob Walker is one of the most frequent users of special orders to give speeches promoting his conservative approach to government. He is clearly a creature of C-SPAN, without it he would not be a national figure.
>
> Television will come to the Senate when Senator John Heinz and Senator Arlen Specter realize Bob Walker is a better-know politician than they are. (T.R. Reid, quoted in Geltner, 1984, p. 33)

Institutional Power

If public recognition causes some measurement problems, the assessment of inter-institutional power shifts is an even more difficult quagmire. Televising floor proceedings could alter the power balance between the House and Senate. While television news and interview programs have traditionally focused more on the Senate than the House, easy access to highly visual House proceedings could change the balance of coverage. If the choice is between an artists rendition of Senate proceedings(or an after the fact interview with a Senator), and live action from the House floor, visually dependent television will lean toward the House coverage. As Senator Howard Baker expressed it, " I don't begrudge the House the recognition or public attention they gain...But it does mean that if we don't get television in the Senate in a decade or less, the House will be the dominant partner in the Congressional branch." (Hunter, 1981, p. 11). For years media analysts have argued that media coverage confers status on the institutions and the members which it covers (see Robinson,1975 and Klapper,1960, p. 129) and the House has the potential for gaining that status due to the vacuum caused by the lack of Senate coverage.

Political Uses

One of the primary fears of some opponents was that House Members would abuse their right to order tapes of floor coverage and use them for political purposes. Specific rules were passed to forbid campaign usage by House Members. In reality, Members have been quite hesitant to purchase the recordings for any purpose (See Garay, 1984, p. 117). The first major use of C-SPAN material for political purposes arose in the 1982 campaign when a challenger to House Minority Leader Robert Michel (R-ILL) used segments of floor debate in a campaign commercial. Not being a Member of the House, the challenger was not bound by House rules. Realizing the potential for C-SPAN footage in campaign commercials, at least one of the congressional campaign committees (Republican) began to create an archive should the use become accepted, but realizing the dual edged sword nature of such use, they have held back in realizing the potential of their tapes, both for incumbents and challengers.

Some Remaining Questions

The consensus of both participants and observers is that the introduction of television technology into the Congress changed the institution and its Members, and that on balance the changes were positive. Given the relatively short period for analysis and limited empirical data, a number of questions remain as to the ultimate impact of television coverage in the House. In order to assess the impact of televised proceedings on public attitudes

and behavior, it will be necessary to carry out a national survey which puts cable and C-SPAN users in the broader context of American politics. The nature of House coverage is currently in flux. The next few months may well see some changes in House coverage as the "CamScan" escapade of last year which involved turning the cameras around secretly to undermine the conservative's use of "special orders" begins to sink in.

Some important policy questions also remain:

(1)What is the government's responsibility to assure that subsidized coverage of Congress reaches the largest audience. Is it just that C-SPAN, with its limited availability be the only conduit or should Congress encourage other outlets (i.e. public television)?

(2)Is the visual record of Congress important for historical purposes? While initial proposals for House broadcasting involved the creation of an archive, currently tapes are simply reused after a few months. No one in the private sector is saving all the footage.

(3)What is the legal standing of video tapes of Congress for determining legislative intent? (see Stanley Bach in U.S. Congress, Senate, Committee on Rules and Administration,1981a, pp. 136-145).

Televising of Congress has opened a new "window" on the legislative process. While that addition has not shaken the foundation, it has cast new light on the proceedings and affected the behavior of those new to being observed in such a way.

TASK 4: Outlining Past,Present and Future Trends in the Application of Information Technology By Congress

PAST AND CURRENT TRENDS

Changing Attitudes

Congress as an institution representing extreme autonomy of component units is by nature slow to change. "No one is going to tell 535 politicians that they must do something in a standardized way." While there has seldom been hostility to the use of technology by Congress,many Members "had to be pulled kicking and screaming, into the latter part of the 20th century (Representative Lindy Boggs, D-LA, in U.S. Congress, House, Committee on Appropriations,1984,p.126). What direct oppostion that existed was more directed at applications such as televising chamber proceedings which did not allow individual members to opt

out as opposed to computerization where initial skeptics were quite willing to let others "do their own thing." In terms of computerization, the initial acceptance or indifference has been replaced by active demands for new and better services.

Technological evolution in other realms has been characterized by four stages: fear,ecstasy, disillusionment and cold reality (Spinetto, 1984, p. 25). Congress is generally at the ecstasy stage right now with initial applications spawning unrealistic hopes which are likely to be dashed before the important, but more limited rightful role of technology takes hold. Within the general trend we find some sub-trends. The House Information System for example followed this general pattern:

-1974-1977 Initial Skepticism with scattered use

-1978-1980 Increased Acceptance through Active Promotion and New Products

-1981-1983 Retrenchment, Less Promotion and a More Reactive Stance (Major budget cuts...It was easier to cut machines than people)

-1984-? New Initiatives, Expanded Line of Services, More Promotion

The general attitude in Congress now seems to be "lets see what technology can do for us." More and more Members are arriving with outside experiences with computers either in previous occupations or from the campaign trail and are demanding the same type of of services they had on the outside.

The Provision of Equipment

The House and Senate started off with opposite strategies in providing information technology to Members. The Senate opted for central provision supported by a main frame computer, while the House provided funding and a great deal of freedom for Representatives to individualize services from outside vendors. The proponents of each approach heartily justify their decisions:

> The House system of forcing members to make a trade-off in funding computers over other support functions is more responsible and efficient. The Senate system of central provision can lead to the computer terminal as a flower stand which they really don't want, but would feel cheated if they had been passed by.
>
> Central provision fosters standardization, comparative testing of applications, and efficiency. It would have been irresponsible to have everyone running off on their own.

In the last year, and for the forseeable future, the House and Senate are converging in their approaches. The Senate has just approved a massive move toward micro-computer networks for each office with considerable room for individual design. The House , on the other hand, has strengthened its Member Information Network with new centrally provided services (such as correspondence management). The funding procedure will still differ, but the kinds of services and equipment in House versus Senate offices will look more and more similar.

New and expanded services cost money, and the trend over the last decade of increased financial expenditures for computer services will continue. Between 1970 and 1980, not taking into account House clerk/hire funds used for the purchase of vendor services, computer expenditures by the legislative branch increased from $48 to $613 million (Chartrand and Borrell, 1981, p. 14).

Applications

Congress' decisions as to which information technology applications to adopt were quite similar to other legislative bodies . While lagging behind state legislatures and many foreign parliaments, it allowed television cameras in at relatively the same historical period. It was a bit more restrictive than many legislatures in terms of controlling the signal.

In relation to computerization, the pattern is even more similar:

> The development of legislative information technology has followed a clear pattern. In almost every instance, the initial applications support legislative and internal administrative functions, such as voting, bill status, bill drafting and code revision,committee calendars, payrolls, office accounts and correspondence. Only after these initial systems have been successfully implemented do most most legislatures develop decision-making assisting and policy analysis applications (Chartrand, 1982, p. 330).

Although few consistent figures are kept as to the level of use of various computer applications, some patterns are evident. Among the MIN data bases , a representative month's figures show that the most popular data base is NEWSWIRE (allowing automated newspaper clipping), Electronic Mail, LEGIS (Bill Status) and FLOOR (Summary of Proceedings and Debate). We have no similar empirical figures available for the Senate, and the above figures do not take into account correspondence management. For the individual congressional office, the story of computerization is still primarily one of a revolution in correspondence management. The vast majority of mail emanating from Congress emerges from a word processor and is addressed and filed via computer. this trend is likely to continue, as more and more offices strive for the "paperless" ideal.

A number of emerging applications would not have been able to stand on their own, but are the by-product of other innovations. Full text searching of the CONGRESSIONAL RECORD, Committee Reports and the like are a by-product of the current printing process. As long as information is collected in machine readable form, it is relatively easy to scan it for key words.

Congress is riding the crest of industry changes and increased integration of technological applications:

> I might define the 1960's as the era of the central computer. In those days we literally carried the work to the computer...This was followed by the era of remote terminals...The 1980,s, will probably be known as the era of functional integration, the era in which computing, data processing, word processing, and communications were brought together (Jack Davis, in U.S. Congress, Senate,Committee on Rules and Administration, 1982, p.20).

Usage Patterns

The willingness to use information technology requires a bit of daring and the recognition of a perceived need. Using the congressional office as the unit of analysis, it was clear that early adopters of computers were a unique set of individuals many of whom had computer experience outside of Congress, were less tied to traditional approaches, and foresaw computer capability for solving their atypical political needs (See Frantzich, 1982, chapter 4 for a detailed discussion). As computer usage increased, the once unique became commonplace and the distinctiveness of the early adopters evaporated. Tables 4.1 and 4.2 point out the growth of usage and the nature of innovators.

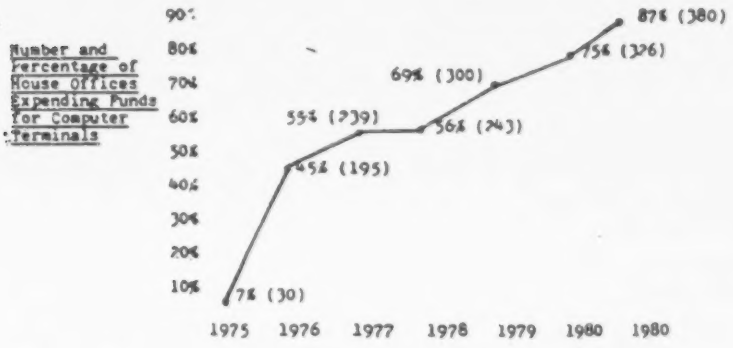

TABLE 4.1. The Growth of Computer Usage by House Members 1975-1980

SOURCE: Frantzich, 1982, p.199

	Percentage Difference in Technological Innovation Among Categoric Group Members and Overall Percentage of Technological Innovation	
	1976 (46% with computers overall)	*1979 (69% with computers overall)*
Marginal members	+11	+7
Junior members	+14	+7
Younger members[a]	+13	+5
Members with no previous political experience	+11	+5
Republicans	+16	−11
Nonretirees	+ 2	+4[b]
Low-seniority members with business background	+25	+14
Junior marginal members	+10	+2

a. Under 40 years old.
b. 1978 data.

TABLE 4.2 The Declining Uniquness of House Computer Users Over Time between 1976 and 1979

SOURCE: Frantzich, 1982, p. 213

Hesitancy on the part of HIS and the Senate Computer Center to consistently gather and analyze statistical data on who is using computers for what purposes is a major impediment to analyzing current and projecting future usage patterns.

Lacking empirical data, some participant perceptions do provide some insights. First, it must be emphasized that relatively few members sit down at a terminal to input data or gather information. Computer use in Congress is largely limited to the staff. Initial usage for correspondence management emphasized usage by lower level clerical staffs, while the current trend is to train and equip middle and upper level professionals.

The demand for more computer power tends to come from those who have had some outside experience:

> It is very often the former Members of the House who come to the Senate who have become accustomed to using...services in the House or Representatives and raised questions about whether the Senate system is as good as it ought to be (Senator Charles McC. Mathias,in U.S. Congress,Senate, Committee on Rules and Administration,1982,p.75).

The usage trend for computers in general is clearly on the way up, but usage is far from universal. Withing the MIN, six hundred offices (Virtually all Member offices, plus committees and support agencies) are on the system. The most popular data base (NEWSWIRE) was used by only two-thirds in a typical month, while LEGIS was used by only 37% of the offices.

There seems to be some evidence of increased sophistication of usage as individuals begin to get the feel for what can and can not be done usefully via computer. Staffs have gone through some of the same patterns as those in private industry:

> We note in the industry--in the desk top computer there tends to be a gadget syndrome. That when they are very new, people tend to play with them quite a bit, and when they get on top of the system, then the usage goes way down...If the machine of a system is a tool, the same as a telephone, you don't need to use it 8 hours a day to get its full potential (Jack Davis, in U.S. Congress, Senate,Committee on Rules and Administration, 1982, p. 31).

The promotion of computer usage has varied considerably between the House and the Senate. As with most change, information technology does not sell itself. It takes a promoter to demand availability and encourage usage. In the House usage has been promoted primarily by staff and particularly by HIS. HIS sees

itself as a vendor selling a "product Line". It is much more proactive attempting to stimulate interest and usage. Growth of applications and usage has been more incremental as new products were put on line and aggressive marketing took place. HIS lessened its promotion a bit during their budget cuts in 1981 and moved from an active field staff to a demonstration and training center approach. Currently HIS is becoming more promotional. While the proactive approach has been guilty of some overselling, by and large it has contributed positively to the education of Members as to the need for more and better information technology.

The Senate Computer Center and the Technical Support Staff of the Committee on Rules and Administration on the other hand have tended to be more reactive. Waiting for senatorial demands before acquiring services. The growth in availability of information technology in the Senate has tended to be more erratic, waiting for demand to grow to a point where something had to be done, and then taking rather large steps which in some cases "leap frogged" generations of technology common in the House. The current Senate shift to local area networks using microcomputers is only the most recent example.

In general information technology adoption and usage by Congress has tended to be piecemeal with a great deal of flexibility available for individual users and no overall development plan. Initial applications were largely "stop gap" reactions to immediate pressures (especially constituent mail) and technology increased efficiency enough that offices could keep up, but seldom get ahead. As one of the prime information technology movers in the House, Representative Charlie Rose (D-NC) stated it ,"The Congress has come a long way since the initial computerization, but it is still in early adolesence." While not at the forefront of the most advanced new technology, Congress which once lagged well behind state legislatures has become a leader in the legislative realm and its experiences are being studied by representatives from state and foreign legislatures as they develop their own systems.

Some Trends For the Future

Future trends are a bit more difficult to discern. Aside from the realization that the level and use of computers will increase, the clearest trends are associated with potential applications of specific new technologies.

INCREASED DEMAND FOR COMPUTING POWER

Increasingly Congress is being populated by Members with direct computer experience, and they are being pushed along by a staff which increasingly has been trained to view the computer as a

tool as crucial as the typewriter was once thought to be. Initial generations of computer users in Congress had to be retrained and updated to fit into the world of modern information technology. This will be less and less the case during the next few decades.

Increased demands may well require acclimating individuals to realize that information is not costless. So far the Member Information Network and the general data bases available in the Senate have been provided free to users. In order to harness costs and reintroduce some equity in bearing the burden for services provided, it may well be necessary to charge users. HIS already has an informational accounting procedure in the development stage.

NETWORKS and INTEGRATION

Two of the key words for the future of information technology both within Congress and in the wider community are "Networks" and "Integrated Information Systems".

> Fundamental to next-generation computing are networks through which computers can share each other's resources as though they were parts of the same machine. The computing power of all the computers on a next-generation network would be available to anyone on the network (IEEE SOECTRUM, 1983, p. 76)

For Congress this is already beginning to mean a LAN (Local Area Network) associated with a particular member or committee office, with the capability of connecting it with external data bases and/or the mainframe computer.

Closely related to networking, and serving as on of its consequences is the increased convergence of information and communications technologies.

> The new-generation systems will permit the integration, storage and retrieval of all types of information flowing through the office...integrated into complete systems... Office communications will be enhanced by new-generation systems that will integrate the telephone system with office computer systems by use of digitized speech. Both local-area networks and wideband, long-distance digital communications systems will support electronic message systems with teleconferences distributed over time and space (IEEE SPECTRUM, 1983, pp. 41-43).

HIS is already offering techniques for integrating all of Its MIN data bases and soon one will be able to globally search a wide range of data sources with simple commands.

> An office full of word processors, personal computers,

> and answering machines may generate large amounts of text and data. But if methods to link and assemble the data are cumbersome, office staff will tend not to link and assemble...A staff member could, at the touch of a few buttons, combine summaries of legislation before the Senate with pros and cons, interest groups for and against and the constituent contacts on the subject (Stuart Mill, in U.S. Congress, Senate,Committee on Rules and Administration, 1982, p. 51).

Networking and Information Integration will put considerable pressure on Congress to begin to standardize is hardware and software. The current free market approach, and the lack of House and Senate coordination will serve as a major stumbling block

One of the major challenges for Congress will be to choose an appropriate number of compatable systems, and stick with them long enough to establish real needs. The rapid change in technology provides a smorgasboard of new generations of both hardware and software which is baffling. Congress must avoid either the extreme of "waiting for one more generation of machines to come out," and jumping at every new change and never integrating the old. Hopefully the rate of change will slow a bit as the market sorts itself out because consumers have gained a more realistic view. Congress can take some solace in the fact that they are not alone in their bafflement.

NEW OPPORTUNITIES FOR DECISION-MAKING INFORMATION

There is considerable disappointment that Congress' initial uses of information technology have been so heavily dominated by constituent communications applications and that less use has been evident for the "higher" cause of making better policy decisions. While there will be advances in constituent communications applications, usage is so developed in this realm that there is less room for change and we should be seeing some of the policy related benefits (freeing up staff time primarily) beginning to take hold.

While fully accepting the limitations of information as responsible for policy decisions, some increased use of information technology in the policy realm is likely. In the first place the technological capacity to analyze certain types of data tends to demand its collection and use. There will be increased pressure to collect comparable empirical data on as many legislation related topics as possible. Initially this will mean mandating more data collection and probably a revival of the "social indicators" movement which has been pushing for more empirical data, especially in policy areas not normally known for such data. Ultimately static historical and trend data will be replaced in some areas by more "real time information systems"

which will allow Congress to monitor ongoing events and to have enough forewarning to take corrective action (Sackman, 1971 pp. 222-223). For Congress this could mean more scientific and regular monitoring of public preferences through an ongoing polling capability. The next step of course is a tele-democracy where information technology would facilitate instant plebecites, but it is unlikely that current decision-makers would relinquish their current interpretive and judegmental powers over policy preferences.

While everyone is touting the coming of "intelligent" machines, they will find little applicability in an institution like Congress. The shifting value choices which underly policy decisions will make it virtually impossible to agree on the logic which would have to guide such a machine. The "electronic congressman" will be supported, but not supplanted by the machine.

TELECONFERENCING

Initial attempts to implant teleconferencing into the standard operating procedures of Congress was a failure. As one participant put it:

> Teleconferencing will allow remote hearings in the future. The technical capability arrived before it could be comfortably done. Having to use special equipment at an often inconvenient location exacerbated the normal human tendency to feel more comfortable with traditional modes.

As teleconferencing becomes more accepted in the wider society, Congress will tend to follow along. As has been the case in other realms, a technique such a videoconferencing will only work if the power holders require its use and leave no other communications alternative. Given the choice between not having their case heard and being part of a policy-related teleconference, most lobbyists would put up with the initial skepticism and inconvenience of a teleconference. As more and more congressional staff members are located in the district, intra-office teleconference will help ease the sense of being out of touch. With teleconference improvements such as "shared screen conferencing" which allows the easy transmission of visual and printed data, the utility of teleconferencing should become more evident.

TELEVISING CONGRESSIONAL PROCEEDINGS

For the House, an increased cable audience and expanded awareness of C-SPAN will increase public awareness. As electronic mail becomes more common, we will see more constituents monitoring Congress via C-SPAN and communicating their preferences

instanteneously. Nevertheless, the loyal C-SPAN audience will remain small and quite atypical of the population. With the arrival of cable television to Washington D.C., C-SPAN will gain access to a select group of very interested political activists who realizing the potential impact of C-SPAN will try to use it to their advantage. Interest groups will monitor coverage more closely and flood the call-in programs.

In terms of the Senate, coverage of floor proceedings will definitely come, the only question is when. The Senate is not going to allow the House to bask in the limelight too long. Given the more free form nature of debate in the Senate, television coverage is likely to affect its procedures even more than in House. In order to make itself intelligible to the outside world, more structure will be an absolute necessity.

INFORMATION TRANSFER

Just as word processing has revolutionized the way people write and think, new techniques of information capture and transfer will increase efficiency and again change the decision-making process. Voice activated electronic message systems and voice editing of documents are coming in the forseeable future. Optical Character readers are already here and dramatically reducing information transfer time and costs. As a purely legislative application, the California legislature is talking about combining word processing and television by instantaneously amending legislation on a screen above committee member's heads (U.S. Congress, House, Committee on Appropriations,1981, p. 323).

PERSONAL COMPUTERS

While the 197's were the age of centralized data processing and mainframe computers, the 1980's and beyond belong to personal computers. Congress is just on the brink of the PC avalanche. Currently 17% of House offices report using PC's, with the primary use still being as "dumb" terminals (U.S. Congress, House, Committee on House Administration,1984, p. 6). The Senate is currently embarking on a major shift to desk top computers. The level of interest by individual Members is significant. Fourteen Members regularly attended a seven week course offered by HIS this year, and the demand for additional courses is growing.

A major appeal of the micro-computer is the autonomy it brings. Rather than having to go hat in hand to the data processing experts, the individual control his own efforts through "hands on" approaches. While Data Processing experts often bemoan the lack of standardization, the lack of basic DP disciplines such as backup procedure and documentation (U.S. Congress, Senate, Committee on Rules and Administration, 1983, p. 304), and less

publicly their own loss of power, many users are drawn to the micros precisely to get around DP departments and their limiting routines.

The proliferation of PC's will require the congressional a computer support staff to whom users can bring their problems.

While PC's lack standardization and raise havoc with attempts to monitor and control their use, it is those very factors which may make them most important. The proliferation of data bases and software will lead to a new creativity in legislative analysis. users will be able to tailor analysis to their particular interests without being held captive by programs written for other purposes. As one staff member put it:

> It is amazing, they get the machine in their hands and can go off on their own testing all the "what ifs" their hearts desire. The potential of the personal computer is limited only by the imagination of the people who use them.

The proliferation of information may make policy decisions harder to come by.

> Microcomputer spreadsheets may well lead to more disagreement over data. Spreadsheet program have different internal logics and possible errors are difficult to spot. Rather than arriving with the same basis from which to work, committees or Members may arrive with different figures, even though they came from the same initial data.

From an organizational perspective, the PC will have a decentralizing impact. Although large data bases will have to be created centrally and downloaded, access and control over smaller data bases, and the manipulation of all data bases will be in the hands of a multitude of users. The prospects for creative analysis are as exciting, as the potential for conflict is likely. Personal computers will probably involve more "growing pains" than the initial introduction of computers into the Congress.

TASK 5: Some Questions For Future Research

While the preceding discussion ranged broadly, a number of questions remain. One set of questions involve the desirability of collecting more and better data by which to verify some of the assertions as to the implications of technology. A second set of questions point to some of the policy questions the introduction of information technology to the Congress will require us to answer.

THE DATA REQUIRED FOR FUTURE RESEARCH

Much of the preceding analysis was hampered by the lack of comprehensive time series data. Two particular areas stand out.

Information Technology Usage Data

While it is often possible to empirically measure the uses of various technologies and/or data bases by monitoring transactions or connect time, the staff units overseeing the technology have been hesitant to gather and analyze such data. While analyzing the types of Members and offices using specific applications would give both a picture of current utility and a projection of future use, the hesitancy to monitor individual use, even in purely statistical form has been assiduously avoided. Although quantity of use is only one measure of utility, it is a start. There is little question that such data could be collected and analyzed without compromising the privacy of individual members.

Existing staff and Member surveys have been pushed to their ultimate level of utility. We now need more in depth perceptions of users. Individual office case studies, and/or user seminars to identify usage patterns and perceived consequences are also now in order.

Constituent Use Of and Desire For Increased Information

A basic rational behind televising the House was the assumption that citizens wanted more information presented through the use of modern information technology. Existing survey data to verify those assertions is quite limited since it either deals with a subset of the population (i.e. cable subcribers alone), does not ask all the relevant questions, or is limited to one point in time. We need a national panel type survey which will assess the following:

- -Public knowledge and evaluation of Congress
- -The level of interest in expanded information
- -Current information sources
- -The types and volume of political behavior

PUBLIC POLICY QUESTIONS

The introduction of modern information technology into the Congress suggests so policy questions which will need to be addressed.

Civil Liberties:The Question of Privacy

> Does the Congressional collection, use and dissemination of information about individual citizens pose a privacy problem?

While discussions of privacy pervade the literature on the implications of modern information technology, Congress has

showed little concern for the privacy problems its own data bases present. Those who even consider the problem tend to combine "privacy" and "security" with the emphasis on security. The two concepts are related, but separate. Security refers to protecting data collectors and users from sabotage or unauthorized use. Privacy on the other hand refers to protecting the data subjects from having information about them used in a way they did not intend or desire(See Smith, 1982). A person's privacy may be breeched without any breech of security. Legitimate data collectors and users could use it for unintended purposes or enhance it through matching strands of information to create a profile. Congress has shown a moderate amount of concern for protecting the security of its data files through password protection and the like, but virtually no concern for the privacy questions associated with the information it gathers on constituents. Congress specifically exempted itsellf from the Privacy Act which requires other government agencies to allow individuals to see and correct files about themselves and to limit the use of such files. Individuals requesting casework help must give Members of Congress permission to review their records in executive agencies, but once back in the offices the files are less protected. The problem is exacerbated by the fact that Members of Congress are viewed as owning their own files.

The extensive use of matching by congressional offices to create targeted mailing lists by combining such things as car registrations,voting registration, congressional correspondence records etc. could be seen as a technology enhanced invasion of privacy. While the rules suggest that such lists created at the public expense should not be shared with a Member's campaign or outside groups, it happens and no one is really monitoring it.

With the shift to microcomputers and the ease of copying and transporting disks the difficulty of policing use in dramatically increased. In the Senate, "it would have been tempting fate to make too political a use out of the files since so many people saw each project, but now who would know?" As a key staff member put it: "It will probably take some scandal before any action is taken."

Before cracking down too heavily on the executive branch and private threats to citizen privacy, Congress would be well advised to make sure that its own house is in order. House and Senate rules and ethical standards must be updated to take into account the challenges of modern information technology.

Civil Rights: The Right to Access

> Does Congress have the responsibility to provide the public with all official information in a state of the art technology format?

Congress' shift to storage and retrieval of information using modern information technology threatens to drastically affect public access. In those areas where records are only available via computer or cable television, a shift to those technologies will exacerbate the division of society into information "Haves" and information "Have Nots" (OTA, 1981, p. 119;Porat, 1978 pp. 41-44). Congressional data bases are controlled by a number of masters and there is no consistent pattern as to what the public is allowed access . The Library of Congress has a public version of the Bill Status System, but the CONGRESSIONAL RECORD will not be available to the public on-line. "If there is a general tendency, it is to say 'No' to public access." Those in charge emphasize that making congressional data bases available to the public is less a technological problem than an economic one. Congress is afraid of having their system flooded and service to decline. Even with rights of public access, realistic access will be limited by physical proximity, awareness and access skills. If Congress opts to make its data bases available through commercial vendors, it is in line for the charge that the public will be paying twice for the same information. In those areas where technology supported information bases duplicate low technology (hard copy) formats another question emerges. Since automated data bases allow more efficient searching, those members of the public denied access may still have the basic information (i.e. the CONGRESSIONAL RECORD, IDGEST OF PUBLIC BILLS, etc.), but the differential in searching and analysis capabilities will put them at a disadvantage.

Televised coverage of Congress provides another access problem. Currently the signal is available only to cable subscribers in those areas with C-SPAN. As we have seen access to cable and C-SPAN is not randomlyy distributed throughout the population. If access is deemed a problem, Congress may want to consider alternative distribution methods (i.e. public television, federal viewing centers, etc.).

In the final analysis, Congress will have to reconsider the definition of the "public record" to include the enhancements provided by modern information technology and consider its role in making sure that equality of access is taken into account.

Democracy and Representation

Does technology facilitated communications capabilities distort the representational process?

Communications technology is a potential two-edged sword which can either enhance or diminish the nature and equality of representation. By facilitating the two-way communications between Congress and the public, a better informed public can make their wishes known more efficiently to their elected

officials. On the other hand, selective access to information and communications technologies may enhance the power of some constutuents and thereby diminish that of others. In addition, sophisticated communications techniques and targeting can distort the informing process through selectivity and format. Both the promise and potential pitfalls of technology supported democracy are great.

The preceding five sections include some suggestions as to the potential implications of introducing modern information technology to the Congress. The verification of these projections at this point in time vary from solid facts to possible trends. The use of these technologies by Congress is generally less than a decade in most cases, and the fact that some major implications have already been identified warrants continued study and analysis.

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